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Southern Academic Review

*A Student Journal of Scholarship --
Featuring Authors:*

Laura J. Button
Colleen Campbell
Emily Comer
Christy Cox
Julie Dykes
Maria Glaser
Angie Godwin
Andy Harrell & Ben Roberts
Clay McCaslin

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Southern Academic Review

A Student Journal of Scholarship

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Portrayals of Psychiatrists in the Movies: Fiction vs. Reality

Laura J. Button

Psychiatry and the movies have demonstrated a particular affinity for each other, since to an uncommon extent they share an interest in human behavior in general, and in deviation from the norm in particular (Schneider, 1987). However, at times the psychiatry that is practiced in the movies bears little resemblance to that practiced in reality. This paper will explore the ways in which movie psychiatry differs from "real" psychiatry, with particular emphasis on the psychotherapeutic relationship and female therapists.

CATEGORIZING MOVIE THERAPISTS

One of the most obvious differences between real and film therapists is that the film characters tend to be oversimplified. As a whole, movie therapists are not given the same nuances of personality that other characters are given. The majority, like Dr. Kik from The Snake Pit (1948), seem to have no lives at all apart from their profession. Some, like the psychiatrist from Benny and Joon (1992), are rarely seen even in the context of their profession, and are seen instead as props used to further the plot of the movie.

Dr. Irving Schneider (1987) describes what he sees as the three main types of movie psychiatrists, which he refers to as Dr. Dippy, Dr. Evil, and Dr. Wonderful. The Dr. Dippies are so named after the first ever movie psychiatrist, who appeared in Dr. Dippy's Sanitarium in 1906. These are the doctors who are bumbling and

ineffectual, often because of ignorance or negligence. They simply cannot be taken seriously. For example, in Dr. Dippy's Sanitarium the doctor calms down his raving lunatic patients by giving them all pies. This author would also place in this category the psychiatrist from Carefree, a 1938 musical in which Ginger Rogers is cured by Fred Astaire, the dancing shrink.

The second type of therapist identified by Schneider is the Dr. Evil. These are the doctors who so gleefully use Electro-Convulsive Therapy, medications, and psychosurgery often for their own pleasure or for other personal gain. The name is taken from a 1908 movie, The Criminal Hypnotist, in which the title character hypnotizes a young woman in order to acquire her fortune. Other therapists in this category might include the murdering doctor from Spellbound (1945), the cigar-smoking doctor from The Snake Pit, and, although she was not actually a doctor, Nurse Ratched from One Flew over the Cuckoo's Nest (1975). Films which feature a Dr. Evil tend to present the profession of psychiatry as being the agent of a repressive society.

The third type of movie therapist, Dr. Wonderful, also comes from The Criminal Hypnotist, this time referring to the good doctor who comes in and solves everything. This is the type of doctor who works for free among the poor, such as Dudley Moore's character in Lovesick (1983), and who does not mind if a client calls in the middle of the night, like Dr. Berger in Ordinary People (1980). In the book Psychiatry and the Cinema (1987), Glen O. Gabbard mentions a colleague who was treating a teenaged girl at the time Ordinary People was released. In this movie, Judd Hirsch was quite well received as a psychiatrist who is kind, understanding, and firm. After seeing the movie, the teen would often chastise her therapist when he said or did something she disagreed with, arguing that Dr. Berger (the Hirsch character) would have handled the situation differently. This is just one example of the effect that movies have had on people who are in therapy or who are considering it.

MOVIE DISORDERS

Another way in which movie psychiatry differs from reality is in the types of problems which are presented. Many disorders seen in film bear little resemblance to any of the disorders described in the various editions of the Diagnostic and Statistical Manual of Mental Disorders (Schneider, 1987). Of the real disorders which are presented, the ones given the most attention are the particularly odd, dramatic, or bizarre ones. These include dissociative reactions, such as amnesia, seen in Spellbound, and multiple personalities, in The Three Faces of Eve (1957); homicidal mania, which is frequently seen in horror and action/adventure movies; substance abuse; hysterical paralysis, often seen in war movies; phobic disorders; transsexualism and transvestism, as in Psycho (1960); factitious disorders; and schizophrenic and paranoid disorders.

One of the biggest Hollywood favorites is amnesia, because it naturally lends itself to a dramatic ending such as that of Spellbound. Typically, all the experience and knowledge of the therapist are needed to reach that inevitable outcome, the uncovering of a traumatic event (Schneider, 1987; Gabbard & Gabbard, 1985). Realistically, psychiatrists rarely find a patient whose entire set of problems is caused by a single traumatic event. However, Hollywood often takes the view that one event from a character's past, usually in the childhood, is the root of all a character's problems. All the movie therapist must do is dig up the single repressed memory and force the patient to confront it, and the patient is miraculously cured.

This oversimplification of the therapeutic process is one of the main failings of filmmakers in their depiction of psychiatry. Movies almost invariably equate the etiology of a disorder with its cure. In reality, however, the word "cure" is rarely even used by psychiatrists, who favor more accurate terms such as "improvement" and "recovery." It seems Hollywood is all too ready to dismiss the amount of work which is involved in the therapeutic process. This can be damaging to actual therapy, for clients might enter therapy expecting the type of easy cure predicted in the

movies, and might subsequently become discouraged when this easy cure is not forthcoming.

TREATMENT IN THE MOVIES

Other ways in which movie psychiatry differs from actual psychiatry is in the types of treatment favored. Movie therapists tend to opt for the more radical forms of treatment, which makes sense, sense they are treating more radical illnesses. Movie psychiatrists love sedative, anti-psychotic medications, institutionalization, straight-jackets, lobotomies, and electroconvulsive therapy. Only within the past fifteen or twenty years has Hollywood been willing to push aside these radical treatments and focus instead on clients in outpatient therapy, which consists more of discussing problems with a professional, and allows for deeper exploration of the psychotherapeutic relationship.

THE PSYCHOTHERAPEUTIC RELATIONSHIP IN MOVIES

As mentioned above, the moviegoer has seen very little of the actual therapeutic process in film. What Hollywood has focused on instead is the therapeutic relationship between the analyst and the analysand. Two terms which are closely associated with Freud, transference and countertransference, are important in understanding movie psychologists.

Transference is the core of psychoanalytic therapy. This is when the patient takes his or her emotions and attitudes towards an important person in his or her life, such as a parent or sibling, and directs those feelings towards the analyst (Schill, Harsch, & Ritter, 1990; Gabbard & Gabbard, 1985). The analyst, in turn, acts as sort of a blank screen onto which the patient can project those feelings. Transference can be positive, as with Virginia and Dr. Kik in The Snake Pit, or negative, as with McMurphy and Nurse Ratched in One Flew over the Cuckoo's Nest.

Countertransference is the feelings which the analyst develops towards the patient (Gabbard et al., 1985; Schill et al., 1990). The analyst must be careful not to let his or her own vulnerability affect the relationship with the patient. In several types of therapy,

potential therapists or students are required to undergo psychological evaluations or counseling before they are allowed to practice. This is alluded to in Spellbound when Dr. Peterson seeks the help of her mentor, Dr. Bruloff. This is in part to help the therapists learn to recognize their own needs and fears, so that they can better deal with countertransference when it does occur. Hollywood, however, prefers to show the analyst giving in to his or her feelings, particularly if the analyst is a woman. For example, Dr. Peterson is initially seen as a very capable therapist, devoted to her work, but otherwise very cold, a fact which is commented on by her colleagues. The implication is that she needs to fall in love with a man in order to thaw out.. Later in the movie, her mentor tells her that "women make the best psychoanalysts until they fall in love. Then they make the best patients."

FEMALE PSYCHOANALYSTS IN FILM

The tendency is for Hollywood to show that a woman cannot practice psychotherapy and have a successful romantic relationship. In a 1989 study by Gabbard and Gabbard, virtually every female movie analyst was seen as lacking a stable relationship with a male—she's either divorced, widowed, or a spinster. The authors were unable to find a single American film which shows a female analyst's husband or lover. It should be noted here that the 1991 film Prince of Tides did show a therapist's husband, but the marriage was not a happy one. The only romantic relationships that the female psychiatrists have in the movies are with their patients or former patients. By contrast, the Gabbards found twenty-five films in which the lovers or wives of male psychiatrists appear. They also found nineteen films where a female therapist falls for a male patient, versus only nine films in which a male therapist falls for a female patient. This is particularly striking in relation to the findings of Pope and Vetter (1992), who surveyed members of the American Psychological Association (APA) and found that when it comes to sexual relationships with patients, male offenders greatly outnumber the female offenders.

The effectiveness of cross-gender treatment in film is also

quite telling. The Gabbards found thirty-three films in which male therapists were successful in treating female patients, compared with only two films which showed female therapists successfully treating male patients. These are Private Worlds (1935) and The Last Embrace (1979).

It should be noted here that the Gabbards' data includes movies up to 1987. More recently a rash of movies featuring psychiatrists have appeared. Most of these movies do follow the patterns already established, but a disproportionate number of them portray therapists having relations with their clients. A twist on this theme appears Final Analysis (1992) and Prince of Tides. These movies show therapists romantically involved with a client's sibling. These relationships are no less unethical, because in each case the psychiatrist has been acting in a therapeutic capacity towards the love interest as well as the client.

In reality, the APA is quite strict about there being no romantic involvement between a client and therapist. The guidelines are, for the most part, very specific (APA, 1981). Recently, these guidelines have been revised to cover both pre- and post-termination romantic involvement.

The most positive portrayals of female psychoanalysts occur when the patient is also a female. One such movie, I Never Promised You a Rose Garden (1977), is often cited as "an example of effective psychotherapy with a psychotic patient" (Gabbard et al., 1989). However, here again the therapist has no husband or children, the implication being that she compensates for her unsuccessful personal life by pouring so much of herself into her work.

CONCLUSIONS

In portraying the profession of psychiatry (as with many of its other types of portrayals), Hollywood draws from the extremes to create its own reality. Some of the misconceptions advanced by filmmakers include that most therapists are goofy, cruel, or too good to be true. Psychiatry is a machine, like any other organization, and is much more concerned with processing pa-

tients than with helping them. It is also an instrument used by society to repress or destroy individualism and creativity. Real psychological problems are extreme and easily diagnosed and cured by cutting into the brain or sending electricity through it. If this does not work, the best thing to do is to drug the person, restrain them, and lock them away. Instead of using invasive means, a therapist can verbally hack away at a patient's subconscious in order to expose the repressed memory that is causing all the problems. Once the cause is identified, the problems go away. It is fine for a therapists to date a patient, because the therapist knows all the client's problems and can deal with them better than anyone else. Men can balance careers as psychoanalysts and their personal lives, but women cannot. Also, women cannot effectively treat male patients. They might as well sleep with their male patients, because they can't do anything else for them. Also, there is nothing wrong with dating a client's family member, such as a sibling, even if you also counsel the sibling.

Luckily, the public does not believe everything it sees in the movies, but fact is often difficult to distinguish from fiction. Hollywood has done psychiatry a service by promoting it so frequently onscreen and allowing people to understand that help is available. however, as the above list of commonly portrayed misconceptions indicates, Hollywood may have hindered the effectiveness of psychiatry by giving the lay public a false impression of what psychiatry is and what it can do.

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I Never Promised You a Rose Garden (1977)

The Last Embrace (1979)

Ordinary People (1980)

Lovesick (1983)

Prince of Tides (1991)

Final Analysis (1992)

Laura Jeanne Button is a senior English and Psychology double major.

She has decided, however, that Harold Bloom is not worth

psychoanalyzing, and Sigmund Freud is not worth deconstructing.

Having failed to find a middle ground between the two fields, she has

decided to return to her public service roots. She now wishes to

become an English professor, barricade herself into a stuffy, book-filled

office, and terrorize undergraduates. She also wishes to thank those

members of the English faculty who have forced her to speak in class,

as well as Professor Nancy Davis,

for the inspiration to write such a scholarly paper.

Effects of Deforestation on Indigenous Groups and Their Environment

Christy Cox

Brazil is a country shrouded in mystery and intrigue. The visual image of towering trees exploding through the clouds as spotted jaguars, rainbow-colored birds, and camouflaged reptiles teem throughout the green foliage dances across the minds of all people—young and old. Few who ever enter into the depths of the Brazilian rainforests will leave unscathed. In the words of Loren McIntyre, a photographer for National Geographic,

death is here [in the rainforests] already, . . . Death always here, and its most perfect agent is being in the wilderness alone. A fall, a bird's screech stealing one's attention at the wrong instant, a toxic vine squeezed for water, a venomous insect. One can be killed by any of those . (144)

Yet there are some who have taken the death and risks and changed them into a way of life. These are the Brazilian Indians. They know no life outside the jungle and become lost, confused, and frightened when faced with the "white man's world."

Unfortunately, the white man is uprooting the Indians' livelihood by destroying his homeland:

Highways being driven through the jungle establish the first contact with Indians; exposing them to white men's diseases against which they have no immunity. They are also confronted by customs that clash with and often conquer their own traditions. Next come the investors, who level large tracts of

forest to create pasture and set up timber, mining and cattle operations. In their wake come settlers to work on the properties, squatters who carve out subsistence plots and gain legal rights to their land after only a few years, peasants who do manual labor in exchange for room and board, gold prospectors who have been pouring into the Amazon region after recent strikes and so called "grileros" who forge deeds and then swindle unsuspecting purchasers. Finally come the hired gunmen who settle accounts with violence (Hoge).

This is the representative chain of violence that has nearly annihilated the Indian population, taking it from eight million when Europeans first encountered the Indians to 200,000 today (Place 133).

Why is this chain of violence so destructive to the Indians of Brazil? By destroying the forest, one destroys their very existence. As the International Herald Tribune put it recently, "Possession of the land is the most serious problem today for the Indian [because] the Indians of Brazil are hunter-gatherers and depend for their livelihood on the forests that the settlers are denuding" (Hoge). The forests and the life forms they contain form an intricate web of interdependency. The co-dependency is so intense that any disruption to this supporting "web of life" can and usually does result in the loss of Indian life. As Robin Hanbury-Tenison writes, "less than six percent of the Indian population survived the 'discovery' of Amazonia" (4). A number of things introduced by the settlers caused this mass genocide. For example, the clear-cutting of the forests and destruction of water sources reduced game while the natives also suffered from an introduction of diseases from which an Indian's body cannot defend itself. According to government figures from Brazil, "38 percent of all deforestation in the Brazilian Amazon between 1966 and 1975 [was due] to large-scale cattle ranches, 31 percent to agriculture, and 27 percent to highway construction" (Caufield

40). Hanbury-Tenison points a finger at oil exploration as a main cause of forest destruction, saying it "is destroying their [Waorani Indians] environment, polluting rivers, and settlers desperately try to farm the land where the forest is cleared" (5). The "Indigenous peoples ' all view land as the basis of their very survival'" ("Indigenous" 53). It is because of this symbiotic relationship that Guilherme M. de La Penha, Director of the Museu Paraense Emílio Goeldi, reminds us of what he saw while visiting a Kyapo Indian village, "I saw a self-reliant people safe-guarding what they knew to have value: their remarkable mastery of nature" (ii).

The biologist who looks upon the Indians' mastery of the forests will be green with envy. For centuries mankind has tried unsuccessfully to conquer God's most beautiful and deadly creation. Yet the Indians are God's chosen few. They have successfully tamed the wild. Catherine Caufield reminds us that, "Few scientists ever become as expert as natives of the forest in distinguishing between the many hundreds of forest species" (79). This paper is going to attempt to relate two things: one, to unravel different aspects of the web of interdependency among the Indians and their environment; and two, to show how settlements in the Brazilian rainforest are destroying the ecosystem and taking with it not only unique flora and animal species, but also the Indian tribes that have spent centuries learning to survive in the wild.

The Indians use the forest for everything, from land on which to grow crops to medicinal use of the flora. A National Geographic story featuring the Wayana Indians tells of

a small clearing beside the Itamy River, laboriously claimed from the forest by primitive means—hand saw, axe, and brush fire, Cognat [a French government agent working with the Indians] explained that although the Wayanas are an agricultural people as well as hunters and fishermen, the soil is so poor that they have no permanent fields. Instead, they grow their crops—manioc, bananas, sugarcane, and

yams—in temporary forest plots cleared by the slash-and-burn method [to be described later]. (71)

Although the Indians make significant use of the land for farming, the forest provides a number of tribal foods. Large ants are eaten live, wild honey sweetens the tongue, and smoked iguana meat is a delicacy. ("What Future" 74) Women generally collect the smaller items for eating: "honey, fruits, crustaceans, edible caterpillars and other small animals" (Ricciardi 23). The men are kept busy with the job of hunting larger animals. They use arrows made of canes and that are grown in the Indians' gardens to hunt monkeys, rodents, and large birds (23). Interesting techniques of calling forest animals are used by Indians on their hunts. Adrian Cowell gives an example: "'Toucan tree,' the Indian gleamed, and sitting down he made a noise by blowing through two leaves pressed tightly between his thumbs. He repeated this once or twice, and soon three birds arrived in the tree above" (24).

The forest serves many more purposes than just keeping the Indians fed, however. Olsen and Sweeny state, "Species provide direct use values as materials for food, clothing and shelter, and as feedstocks for medicines, genetic research, and cross-breeding to improve crop characteristics" (2). The Tasaday used stone and bamboo to make tools and orchid leaves function as clothing ("The Strange Case" 280). Certain soils are used for making pots and trees become canoes when a gifted Indian brandishes a knife to it (Cowell 33). The forest provides dyes, rope, thatch, building materials, even poisons (Ricciardi 23). The South American liana is used as an arrow poison by some tribes. Army ants' pincers function as stitches with which to close wounds (Caufield 219, 232). Fruit from the petroleum nut tree is used to fuel wick lamps (Caufield 233). Yet all of these resources are in danger of extinction.

Deforestation, through clear-cutting and forest fires, appears to be the primary cause of concern. According to Arnold

Newman, in 1988 alone an area the size of Belgium was burned. Currently it is estimated that a tract of the rainforest larger than half the continental United States is being burned by forest fires (104). Forest fires, when controlled, are a very popular form of clearing land for Indians and settlers to use to farm. Yet one must be careful: "If the forest is cleared, the weak soils deteriorate from the exposure to sun and rain: they lose their nutrients and soon turn into sterile pink dust and mud" (Hemming 25). With it, they take the jungle's rivers and fish, and most importantly, the animals that the Indians hunt ("Indigenous" 54). All the nutrients used by rainforest vegetation are found within the top two inches of the soil. This is where organic matter is rapidly decomposed, resulting in an extremely rich topsoil. Yet the third inch of forest soil is sand. This is why deforestation is such a tremendous problem. Clearing the land leaves the soil vulnerable to the heavy rains and the resulting erosion. This erosion eventually leads to a sand-covered beach—totally lacking in vegetation.

However, the Indians have devised a method of slash-and-burn agriculture which prevents this conversion of lush forests to barren deserts. As explained by Mirella Ricciardi,

Indian agriculture is accordingly undemanding on the soils. Gardens are cleared with axes in old-growth forest and, after being allowed to dry in the sun, the felled timber is burned. Most nutrients are lost in the burn and the rains, but the ashes give a temporary fertility to the soil. Yams, sweet potatoes, bananas, plantains, cocoyams and cassava form the staples and are the main crops among the sixty or so species that the Indians cultivate. Such crops have been selected because they are undemanding and grow easily in the nitrogen-poor soils, providing the Indians with a dependable source of calories. (22)

It is also common knowledge among the Indians that for a crop to survive, the land it is planted on must resemble (as closely

as possible) the original forest (Caufield 129). The indigenous peoples—both contemporary and historical—in many areas of Latin American tropical rain forests already plant certain species of fruit and nut trees in their slash-and-burn gardens to extend the productivity of the plot and to attract wild pigs, paca, coati, deer, macaws, parrots and other animals that they traditionally hunt. (Clay 4)

In other words, the Indians have prevented altering the forest's anatomy by not doing large-scale damage. Yet just as the Indians "have adapted their agricultural practices to follow nature's pattern" (Kricher 77), the caboclos (or settlers who are not full-blooded Indians) have destroyed Nature's near perfect pattern.

The invading farmers, or caboclos, farm with a strictly monoculture type system. This method of farming results when only one type of product is sown, resulting in a number of tragedies. Most important is the increased risk of disease and therefore possible annihilation of the crop. Also, expensive chemical correction must be employed to produce a significant enough harvest to make the fertilizer worth the farmer's time and toil (Ozorio de Almeida 66). Jason Clay explains how the indigenous people have mastered the art of agriculture in the rainforest:

Indigenous peoples utilize a number of dispersed garden sites to ensure subsistence production and reduce the risk of total crop failure . . . the utilization of small, intercropped, dispersed sites also reduces the threat of insect and disease damage to crops. This in turn reduces the need for costly pesticides, which might endanger human populations as well as the environment and certainly increase the need for cash. Finally, the utilization of small, dispersed garden sites throughout rainforest areas rather than larger clearcut fields allows the forest to incorporate the gardens more easily when they are

left fallow. (26,27)

Indians rely heavily on game they catch in the forest or fish found in the rivers for their required intake of protein (Caufield 231). However, their levels of protein are not considered "normal" by our standards (88). M.W. Corden and H.A.P.C. Comen conducted numerous studies on different Indian tribes and miraculously enough found no indication of nutritional deficiency. Because of their apparent healthiness, it was hypothesized that the Indians "have developed special nitrogen-fixing intestinal flora to supplement food nitrogen," and also that they have "an ability to store protein in their bodies for several weeks" (Caufield 88, 89). Despite these wonderful adaptations, Indians continue to starve.

A significant contributor to the Indians' hunger is the declining fish population. Catherine Caufield reminds us that what we never imagined possible is slowly unfolding as reality before our eyes. The fate of the fish depends upon the well-being of the forests. Deforestation of fish feeding grounds resulted in a twenty-five percent fall of fish caught in the Amazonian rivers between 1970 and 1975 (244-45). "We cannot fish near the village now," an old man complained. "To fish with bow and arrow, the water must be clear. Besides, the fish have no taste. Many of them now die and wash up on the shore" (qtd. in Lea 683). Despite recent trends to switch to hooks and lines for fishing, an older fishing custom involved the use of timbo. The vine is "wrapped into bundles and floated on the river". The vine is beaten to release a substance toxic to the fish, making them float to the surface of the water (Lea 683). Yet these practices, in addition to more modern ones, are suffering as the fish population falls. Arnold Newman explores a vital dependency between the forest and the fish:

The indigenous peoples have long understood what we have only recently learned: that approximately 75 percent of the commercial fish of the Amazon are dependent on fruits and seeds and other organic material which falls into the water from the forest

at high-water periods, during which time even piranhas switch to a diet of rubber tree (*Hevea brasiliensis*) seeds. A great many tree species, in turn, are dependent on the fish for germination of their seed. For this reason, attuned Amazon residents who do cut wood leave the forest intact at the water's edge to protect these crucial relationships. (183)

Unfortunately, the forest is being felled, and it is taking the fish population, a vital source of protein for the Indians, down with it (Place 95).

Gold miners, invading farmers, and modern companies appear to be the root of the havoc thrown upon the Amazonian fish population. Vanessa Lea describes looking "down from the plane at a river so fouled that not one Indian was bathing or fishing there. It was the Fresco, polluted by the gold camps" (683). Schmink and Wood write:

The mercury that miners use to separate gold from the sand and pebbles dredged up from the river beds was a particularly toxic threat to people's health and to the environment . . . The contamination of the rivers posed a danger to fish, soils, vegetation, and livestock and polluted the water supply for some hundred thousand downstream residents. (101)

Another example of how clearing the land (this time for agricultural use) has damaged the waterways, is the "loss of varzea forests could decrease shade, increase water temperature and effect spawning and breeding. It could also change runoff and flooding patterns as well as overall water quality" (Clay 16, 17). The Indians have tried to better their situation. A local company (Cellophil) was cutting down trees lining waterways and then floating the logs down the river. The tribal leaders asked that these practices be discontinued because they resulted in erosion of the land and damaged fish traps and irrigation canals (Caufield

102). Sadly, the Indians' requests fall upon deaf ears so they are left to look on despairingly as their livelihood is destroyed.

Despite the hunger being inflicted upon the Indians as their food supplies dwindle, starvation is not their biggest fear. Adrian Cowell emphasizes, "An Indians greatest fear is an epidemic" (63). John Hemming, in his novel Red Gold, speaks out, saying,

It was disease that annihilated the Indians. Native bravery and fighting skills were nullified by a lack of genetically inherited defenses against European and African diseases. Decimation by disease has condemned Brazilian Indians to near-extinction.
(xv)

Vanessa Lea further confirms Herring's words by claiming virtual extermination of coastal Indian groups because of disease (694). The horror of the diseases suffered by the Indians is explained by Hemming. He relates that "they are . . . very disheartened. If they fear they will die, death is inevitable" (444). This fear is hard to allay, with the following depictions of sick Indians a reality to those who are healthy:

In 1695 the missions were struck by an epidemic of hemorrhagic smallpox . . . [the symptoms were such that] 'The force of the disease manifests itself in small pustules, like those that attack children in Europe or those that we develop during a high fever. Here the pustules are a terrible plague that invades the entire body and scarcely leaves any member intact . . . [The disease] begins by attacking the throat and then the stomach. Thence comes the continuous flux of blood. With the blood [the disease] finally produces a corruption and evacuation of the intestines themselves. Even the eyes and ears are not spared: some lose their sight, others their hearing. This merciless plague might be just tolerable if it satisfies its fury on the adults alone; but it strikes even unborn children' . . . The Jesuit Joao Felipe

Betendorf have a harrowing account of an epidemic of smallpox that struck the natives of Maranhao and then Para. 'Maranhao was burning with a plague of smallpox . . . Parents abandoned their children and fled into the forests in order not to be struck by that pestilential evil.' Stricken Indians changed for reddish to black in colour; their bodies smelt terribly; and some were struck 'with such force that pieces of their flesh fell off'. (Hemming 467-68, 338)

The influx of diseases has been propagated by three main techniques: miners, deforestation, and formation of settlements. Vanessa Lea cites abandoned mining craters whose stagnant waters make ideal conditions for mosquito breeding grounds, as a paradise for malarial born infections (683).

Place writes, "By March 1988, more than fifty Indians had already died from influenza and malaria introduced by the miners; in just one area north of Poa-Pire, 280 out of 320 Indians had flu, 84 of them with pulmonary complications. The numbers killed by disease and violence during 1988 maybe as many as 500" (65). Fortunately, in 1990 President Collor expelled 50,000 miners from Yanomami lands "in response to an international uproar over deaths of Indians from contagious diseases" (de Onis 680).

Deforestation is also a significant contributor to Indian deaths. Susan Place writes, "clearing larger areas for fields can also lead to increased risk from diseases such as malaria and leishmaniasis, because cleared areas with standing water of low acidity permit proliferation of disease-bearing mosquitoes and flies" (25). Another reason for increasing mortality rates due to mosquito-borne disease is cited by Catherine Caufield.

Mosquitoes generally fed on monkeys and birds found in the canopy of the forest. However, when the area is cleared, the animals typically serving as the mosquitoes' food supply desert the area, leaving the understory animals, including humans, as the new food of choice. In addition, "some viruses, such as those

responsible for dengue fever, also live high in the canopy unless they are forced by tree felling to go to lower levels" (51). Arnold Newman speaks of the black fly, *Simuliidae*, and its potential harm: "The fly . . . is the carrier of an insidious parasitic larva, and the building of the road is likely to lead to an epidemic of onchocerciasis, causing blindness in hundreds of thousands of Amazonian inhabitants" (159).

Although deforestation and mining have resulted in thousands of Indian deaths, the real fear is with the diseases imported by settlers. Ozorio de Almeida enunciates, "Infected populations from one region bring their diseases and carriers to other regions, contaminating vast territories" (67). The Rainforest Indians have no immunity to Western diseases such as the measles, venereal disease, even the common cold. Contact with "civilizados," civilized invaders, often means the near extinction of a tribe. Lethal epidemics will kill off as many as ninety percent of a tribe in a few years (85). Susan Place continues her written tirade:

The most serious public health problems along the Transamazon are caused by the importation of pathogens by people . . . it is clear that incoming settlers and migrant workers, especially from the northeastern state of Maranhao, are responsible for bringing the etiologic agents Plasmodium falciparum, *P. vivax*, and *P. malariae* to the transamazon region. No non-human reservoirs have been found in the wild for these parasites [sic]. (145-4)

In 1971, the Parakanan Indians were first contacted by the white man. At the end of the year, malaria, influenza, and psychological disruption had taken their toll on the tribe depleting its numbers by one-half (Caufield 13). "In Amazonian Brazil," says Arnold Newman,

the 1980's have brought record-breaking epidemics of a recurring viral disease called oropouche, which

can cause inflammation of the tissues around the brain. This coincides with Brazil's influx of colonizers into the region. Health officials have linked the epidemics to huge pools of water ideally suited to the breeding habits of the flies that spread the disease (160).

Catherine Caufield horrifies her readers with a tale of intentional genocide. The intentional introduction of smallpox, influenza, tuberculosis, and measles into Indian groups by Indian agents of SPI, the organization in charge of Indian protection prior to FUNAI, resulted in the organizations' disbandment in 1967 (12). Shmink and Wood explicate:

Yet not all settlers to come into contact with Indian groups meant them harm. Many came as missionaries to offer medical help to the many tribes that continued to rely on shamans (with doctors) for their healing powers. Unfortunately, despite the missionaries' intentions, the Indian continued to suffer. During the years of 1757-1798, Old World diseases killed 11,000 (or one-third) of the Amerindians taking refuge in the aldeias—mission villages set up for Indians. (40)

An August 1976 edition of National Geographic describes, "Each year new mission posts are built, and in their wake come airstrips, metal tools, and weapons. Diseases such as measles and influenza have already struck with devastating effects" ("Yanomami" 213). FUNAI (Fundacao Nacional do Indio, government Indian agency) has gone as far as to expel "missionary and health workers fighting to provide medical protection for the Indians against introduced disease, and to monitor and publicize their plight" (Place 64). Although the Brazilian government is barring government agents from Indian territories, the French government is taking a different approach. Measles and tuberculosis reduced the Wayana Indians to fewer than 500 in the 1950's. The French government decided in 1961 to cut back on visits made

by tourists into the Indians' territory but at the same time implemented a medical program for the Wayanas ("What Future" 70).

Through the introduction of disease and destruction of the rainforests thousand of Indians are dying each year. We are losing twenty-five hectares of tropical forest per minute, an area the size of North Carolina each year (Head & Heinzman 99). Yet as the forests are destroyed, we disrupt "a self-contained and extraordinarily efficient recycling system" (Ricciardi 189). For example, half the precipitation that falls on the rainforests was "radiated back into the air by the canopy of the forest itself". According to The Futurist, "the Indians asserted that "the land is our mother who gave us birth, who generates life; she is life itself and that is why we love, respect and protect her communally. Being life, she is sacred; to destroy her is to destroy ourselves" (53). Adrian Cowell further defines the relationship between Indian and forest: "As a city dweller never looks at bricks, so the Indian never looks at a tree. There are saplings for making bows, and jatoba for making canoes, and certain branches where animals like to sit" (25). As we destroy the forest we also destroy the myriads of symbiotic relationships existing therein. The world of science must actively pursue preservation of the tropical rainforests so that we will continue to have the opportunities for learning that are currently available to students of the rainforests.

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Christy Cox is a Junior Biology/Psychology major from Huntsville, AL. She traveled this past interim to the Brazilian Rainforest with Dr. Doug Waites and Dr. Gama Perruci to study the effects of the political system on the alarming rate of deforestation of the Rainforest. The preceeding paper (which served as her senior Biology interim project) was a direct result of her interest in medical missions work, and the corresponding juxtaposition between the people of less developed countries and the repressive systems holding back any hope of deliverence from the quagmire.

Brazil's Military Policies in the Amazon Rainforest

Angie Godwin

The widespread destruction of tropical forests, particularly those of the Brazilian Amazon, has become one of the most hotly contested issues of the 1990s.¹ With estimates of the annual deforestation ranging up to 205,000 square kilometers, the ramifications of the strain between development and conservation are clearly far-reaching (Place 1993). The position of the Brazilian military within this debate is unique, for although it enthusiastically embraces the idea of development in Amazonia, it also seeks to control the nature and extent of any such activity.

The deforestation problem is unquestionably multidimensional, encompassing a great deal more than the ecological repercussions of land conservation. Just as the possible consequences are predicted to be numerous, so too are the factors contributing to the deforestation. Urban overpopulation and poverty, economic and developmental pressures, and the determination to uphold territorial sovereignty, among other factors, fuel this crisis relentlessly. As a viable force in Brazilian society, the military's desires for Amazonia have weighed, and continue to weigh significantly in the nation's policies toward the region.

By wielding its political power, the military hopes to secure Brazil's existing borders through encouraging occupation of for-

ested areas. Such colonization, it believes, serves to protect its immense span of tropical rainforest from seizure by neighboring countries. Additionally, territorial occupation provides added assurance that the region's abundant natural resources will not be exploited by foreign interests (Skidmore 1988). Thus, the state assumes for itself, under military auspices, the challenging role of both protector and developer of the Amazon rainforest (Yeldejian-Dufau 1992).

Individuals opposed to the military's designs for occupation of the frontier, however, cite the multitude of contributions of tropical rainforests as reason to safeguard Amazonia from unnecessary disruption. Aside from fulfilling the ecological functions which make life possible, these complex ecosystems produce substances which are valuable commodities on the world market (Francis 1991).² Other arguments against developing the rainforest, by focusing on the inhabitants of the region, raise ethical questions (Posey 1989). Finally, critics of the state's action point to the long history of failed efforts to settle and develop tropical regions such as the Amazon as reason in and of itself to save the forest (Smith 1981).

BRAZIL'S HISTORY OF MILITARY RULE

Current policies concerning the rainforest have their roots in precedents established during Brazil's period of military rule. In the early 1960s, deepening economic problems combined with populist politics to create a volatile political climate in the country. The Brazilian military, which had acknowledged a close connection between national security and economic development since the turn of the century, began to place new emphasis on political-economic interrelationships. In light of this, military leaders became concerned that the lack of firm political leadership was contributing not only to economic instability, but to political subversion as well (Hewlett 1980).

From the military standpoint, there was no hope that a

democratically elected president would be capable of guiding the nation to recovery. Therefore, there were only two alternatives: stabilization under an authoritarian government (to be initially headed by the military) or a social revolution. Clearly preferring the former, the military gained the support of the bourgeoisie, whose members relinquished their governing power in hopes of achieving economic stability and preserving democracy (Hewlett 1980).

The 1964 coup and subsequent establishment of military rule in Brazil was inevitable, considering the military's view of the economic-political link.³ Aimed at alleviating economic strains, the basic tenet of this ideology called for accelerated development. It was this belief that shaped the military government's policies toward the Brazilian rainforest for nearly two decades (Hewlett 1980). Although the nation was returned to civilian rule in 1985, the continued influence of the military confirms that there has been little change in government policy (Yeldezzian-Dufau 1992).

While there has certainly been some common ground between the interests of the Brazilian state and foreign capital, the main impetus for development of the Amazon has always originated from inside Brazil. The Amazon became the object of development in a political agenda reflecting a series of well-established state interests and goals (Hurrell 1991). First, the colonization of the Amazon region was an appealing solution to the Northeast crisis. The high population density of northeastern Brazil placed a severe strain on the local economies. When a drought struck the region in 1970, however, the inadequate housing and food supplies of coastal cities demanded immediate relief (Skidmore 145).

A direct attack on the problems of the Northeast was, however, impossible both economically and politically. This would have required a sizable transfer of resources from the Center-South in order to appreciably raise the productivity of the Northeast. The reason capital had never been shifted in this way was because the rate of return on investment was significantly greater in

other regions of the country. To make such a redistribution to the Northeast, then, would have caused Brazilians in other regions to forego economic advantages in order to aid the impoverished Northeast. Politically dangerous, this plan was dismissed in favor of developing the sparsely populated Amazon (Skidmore 146).

Attention was also directed to the Amazon for the interest of national security. The military feared that Brazil might be compelled to forfeit the Amazon valley as a result of its lack of settlement (Skidmore 146). Well aware of the region's geopolitical significance, military officers sought to secure its international borders against incursions from Venezuela and Peru, both of which had already taken steps to populate and develop their respective Amazon regions (Mahar 1989). The concern over this immense territory increased as its valuable mineral resources became known. Fear of foreign exploitation of Amazonian resources grew particularly acute with the launch of Jari, a large tree-farm project designed by Daniel Ludwig, an American who received a concession grant from the Brazilian government in 1967 in order to finance the venture (Skidmore 1988, Hecht & Cockburn 1989). As a result of the Amazon receiving this type of international attention, officials strongly proclaimed Brazil's sovereignty in determining regional policy (Yeldeizian-Dufau 1992).⁴ *Integrar para nao entregar* (integrate in order not to forfeit) thus became the nationalistic slogan which advocated this protective aim (Treece 1989).

The new military government, firmly committed to attracting foreign investment and improving the industrial sector, established measures to develop the Amazon and integrate it into the Brazilian economy (Schmink & Wood 1992). The regime affirmed the rights of private enterprises to use the agricultural and mineral resources of the region. To encourage this, the government offered tax incentives for agribusiness projects and cattle ranching in the Amazon basin. Finally, the government announced several sizable spending programs to settle the area, the most extensive of which were Operation Amazonia and the National Integration Plan (PIN) (Hewlett 1980).

OPERATION AMAZONIA

Through Operation Amazonia and related endeavors, the government encouraged Brazilian investors to take advantage of available tax and credit incentives. In this way, the military hoped to maintain a broad base of political support. At the same time, the regime refuted the charge that it was selling out to foreign capital by asserting that geopolitical concerns warranted such detailed steps. Because this philosophy associated the prospects for profitable economic ventures with nationalistic underpinnings, Amazonian development schemes became linked to the status of the nation itself (Schmink & Wood 1992).

Introduced in 1966, Operation Amazonia attempted to bring private enterprise, both agricultural and industrial, to the region. One component provided public expenditures for infrastructure improvements, including airports, telecommunications, and an extensive road-building initiative to connect Amazonia with the South and Northeast (Mahar 1989). In addition, fiscal incentives and credit lines were available to firms operating in Amazonia through the Superintendency for the Development of the Amazon (SUDAM), which assumed administrative responsibility for executing this as well as other federal programs. Numerous benefits were incorporated into this SUDAM package: capital grants of seventy-five percent of implementation costs; tax holidays of up to fifteen years for corporation's funding projects in the Amazon; duty-free import of heavy machinery; and land concessions or sales at minimal prices (Hecht & Cockburn 1989). Since these measures were designed to attract large investments, including foreign investment, military presence in the area was high (Caufield 1991).

Operation Amazonia, however, included more than fiscal incentives. According to the entrepreneurs, livestock investment was one of the most secure businesses in the region. As cattle ranching necessitated only a minimal labor force, an abundant supply of labor could be easily obtained from the destitute work-

ers who flooded in from the Northeast to work deforesting jobs. Moreover, there was always a demanding market for meat, and cattle were especially resistant to the hardships of tropical ecology (Hecht & Cockburn 1989).

The construction of roads proved to be crucial to opening up the Amazon. The region was, for all practical purposes, virtually cut off from the rest of Brazil, with the only access via air or long sea routes. Although the region's isolation from the more modern southern section may have stunted its economic development, it also protected the rainforest from destruction. In 1964, however, the completion of the Belém-Brasilia Highway connected Brazil's interior with the mouth of the Amazon, marking the end of Amazonia's isolation, and, along with it, the safety provided to the rainforest (Mahar 1989).

The combination of benefits available in the Amazon resulted in the rush of large numbers of investors, squatters, and laborers to the region, all attracted by the improved infrastructure and prospects provided by the government. Almost immediately, however, social tensions began to erupt as settlers endured difficulties in acquiring land, Indians were driven from their territories, and rubber tappers watched their trees go up in flames. Realizing that this program had favored only the most powerful groups, the military generals began to search for a new alternative for the Amazon (Hecht & Cockburn 1989).

NATIONAL INTEGRATION PLAN

Following soon after Operation Amazonia was the National Integration Plan (PIN), announced in 1970. The goal of this plan was to shift the perception of occupation in the Amazon from that of an economic perspective to a social agenda (Hecht & Cockburn 1989). The general intent was to open up Amazonas to settlement and development by moving people from the heavily-populated Northeast into the area. In addition, the government would stimulate growth by declaring Manaus a "free zone" (Flynn

1978). In this way, the military leaders could attack the challenges of the Northeast and the Amazon as a single problem. According to President Emílio Garrastazú Médici, the excess population in the Northeast could flow into the underpopulated territory of the Amazon, thus providing "the solution to two problems: men without land in the Northeast and land without men in Amazonia" (Skidmore 1988).

The PIN included three key elements. First, the Amazon would be made accessible by the construction of a new highway which would be used to settle 70,000 families. In addition, irrigation would be furnished to land in the Northeast and export corridors would be created for the region. This process, the government believed, would lead to the gradual occupation of empty spaces. Along with this, problems such as poverty would be relieved not by redistributing wealth, but by discovering new resources to serve as sources of income. Overpopulation, too, would be solved by directing migration away from its usual path to the metropolitan centers of the Center-South and toward the Amazon (Skidmore 1988).

The Transamazon Highway formed the backbone of the PIN. Although Amazonian development dates back to the turn of the century, it evolved into a thriving enterprise during the years of the military regime, largely due to the construction of the Transamazon Highway (Guimaraes 1991). Running east to west, this two-lane dirt road would stretch through 3,300 kilometers of the Brazilian Amazon and connect with the Peruvian road system on Brazil's western border. Government officials hoped the Transamazon would help fill the population void in the region, which occupies half of the country's territory, but contains only four percent of its population. In addition, the highway promised to provide access to new timber and mineral resources which could fuel the country's economy (Smith 1981).

Construction of the Transamazon Highway was an enticing prospect for factions other than the government planners, too. For army engineers, it presented a challenge which, unlike most

army operations, had a clear beginning and end. Many Brazilians, too, were excited by the thought of "taming" the jungle. Also interested were construction firms which stood to profit from the numerous contracts available in the Amazon valley (Skidmore 1988).

In light of the vast amount of resources expended, not to mention the expense incurred, the accomplishments of PIN-directed projects were indeed modest. Four years after the inception of the program in 1974, fewer than ten percent of the targeted number of families had been settled along the Transamazon. Thus, the Transamazon failed to act as the intended safety valve for the Northeast, with the bulk of the population transplanted to the Amazon coming from other regions of the country. The discovery of new mineral resources along the Transamazon Highway, too, fell short of expectations, for only one company reported conducting such activity by the early 1980s (Mahar 1988).

Adverse environmental conditions resulted from the building of the Transamazon Highway.⁵ As the design of both the highway and the ensuing colonization projects was conceived with little regard for soil topography and fertility, agricultural endeavors in the region suffered. Most of the land in the vicinity of the Amazon is hilly, with a mere three percent of it being naturally fertile. As a result, the quickly eroding soil necessitated costly road repairs and even led to increased burning of the forest in order to compensate for lost soil fertility. Furthermore, the change in the forest flora provided optimal breeding grounds for the *Anopheles* mosquito, a malaria vector. Because the planting and harvesting seasons coincide with the primary periods of transmission for malaria, the agricultural yields were significantly reduced on numerous farms (Mahar 1989).

The human impact of development via the Transamazon was also extensive.⁶ The roadways routed in conjunction with PIN alone affected ninety-six tribes of indigenous peoples—over half the total number of tribes in all of the Brazilian Amazon. In the Yanomami territory, for example, initial contact with outsid-

ers decreased the population of contacted villages by twenty-five percent. These first encounters, however, scarcely hinted of the clearing that followed, displacing large numbers of people, as well as animals (Hecht & Cockburn 1989).

Aside from the impact of the Transamazon, the PIN had several other far-reaching consequences. First, it legitimized the military's call for colonization by extending credits to small farmers and mediating land disputes through the National Institute for Colonization and Agrarian Reform (INCRA). Also, it nationalized the unclaimed lands (*terras devolutas*) lying along Brazil's highways and international borders; in this way, lands likely to be targeted by individual states came under the control of the federal government. Law 1.164, which established this jurisdiction, dramatically increased the role of the military in the Amazon region by virtue of strengthening the power of the federal government (Hecht & Cockburn 1989).

The generals' objectives for the PIN were clear. By exercising control over the desirable land adjacent to the government-built highways, the military intended to limit land speculation. Law 1.164 proved ineffective, however, for it spawned two land markets in addition to the conventional one. An illegal market, based on fraud, competed constantly with a government land market supported by concessionary pricing and land grants. Conflicts resulted because all three markets operated simultaneously, often dealing with the same tract of land (Hecht & Cockburn 1989).

EFFECTS OF THE MILITARY REGIME'S POLICIES IN AMAZONIA

As government-sponsored projects to develop the Amazon region were created to minister to both the social and economic needs of Brazil, it is questionable whether the military elite fulfilled the tasks it set out to accomplish. While the national economy fared better than might have been expected under a

military rule, the welfare of most Brazilian citizens suffered. Socioeconomic indicators for 1985, the year the military regime relinquished power, did not show that conditions had improved over what, in 1964, was cause for a political crisis (Bacchus 1990).

The policies elected by military leaders required heavy expenditures during the early stages of their development projects, particularly those in the Amazon.⁷ In an attempt to avoid borrowing funds to execute these plans, the government cut both wages and welfare benefits so that the money needed for investment could be obtained from savings. Eventually, however, the equipment and high technology involved in these ventures did result in extensive borrowing from foreign countries. Although this strategy achieved an enormous amount of growth, it exacted a tremendous toll on the welfare of most Brazilian citizens. The end result of the military's policies, then, was Brazil's reclassification as an industrialized country. Given this status, Brazil was now, unlike in the past, no longer seen as being in need of special consideration for development funding (Bacchus 1990).

The development of thinking within the military has played a key role in government policies toward the Amazon. Much of this ideology, in fact, stems from what the military believes its role in domestic affairs should be. Prior to the military's exit from power in 1985, revisions of the Brazilian constitution declared that the military should obey the president "within the limits of the law" and maintain internal order. The military position, however, asserted that the issue of the civilian-military power balance should be left vague enough to allow the military to involve itself in domestic affairs when and if it saw fit. In 1987, however, both President Sarney and the president of the Constituent Assembly favored the traditional role of the military with regard to domestic affairs. The political climate of the nation was such, though, that over half the constitutional assembly delegates supported some type of internal defense role for the military (Stepan 1988). Thus, the 1988 revision of the constitution guaranteed the presence of the military in Brazilian politics (Hurrell 1991).

This legal framework presents the military with two possible courses of action, both of which satisfy its objectives but would lead to different ends environmentally. One argument points to the geopolitical need for colonization of the region in order to protect national security interests. By contrast, however, there is also a link between the environment and security. Some planners believe that the short-term dislocation of people required for colonization of the region, combined with the disruption caused by development, jeopardizes national security. In the long-term, too, they maintain that the impact of developing the rainforest threatens national security because it destroys the natural resources upon which Brazil depends (Hurrell 1991).

An influential force in Brazilian society, the military has played a primary role in both determining and executing policy in the Amazon rainforest. Military leaders assert that the nation's interests in the region can be best preserved through its development and colonization. This would not only ensure that Brazil's borders are protected from incursions, but also that its valuable natural resources are guarded against foreign exploitation. By present indications, it appears that the state will continue to play the delicate role of both preserver and developer of what is perhaps Brazil's most important resource, the Amazon rainforest.

Notes

¹ An overview of these debates is provided by Adrian Cowell, The Decade of Destruction: The Crusade to Save the Amazon Rain Forest (New York: Henry Holt, 1990) and Emilio F. Moran, Developing the Amazon (Bloomington: Indiana UP, 1981).

² It is worthwhile to note that, according to some Brazilians, at least, the need for economic development takes precedence over the protection of the rain forest. This is evidenced by an interview by the author with Louiz Epifanio de Silva (January 14, 1994, in Manaus, Brazil), an ecotourism guide. Though he is a native of the rain forest, he recognizes the need to provide jobs for Brazil's citizens, as well as revenue for the country. Epifanio de Silva believes that the rainforest should be preserved, but, he says, the people come first.

³ For a detailed account of the military's role and objectives in Brazil, see Alfred Stepan, Rethinking Military Politics: Brazil and the Southern Cone (Princeton: Princeton UP, 1988).

⁴ See Rachel M. McCleary, "The International Community's Claim to Rights in Brazilian Amazonia," Political Studies v39 (1991): 691-707 for an analysis of the current debate over the 'internationalization' of Brazil's Amazon region.

⁵ For a discussion of the complex biological and ecological systems of the Amazon rain forest, see John C. Kricher, A Neotropical Companion (Princeton: Princeton UP, 1989).

⁶ Marianne Schmink and Charles H. Wood, Frontier Expansion in Amazonia (Gainesville: Florida UP, 1984), provide a detailed look at the impact of development on indigenous populations.

⁷ See Michael B. Ryan, "Calha Norte: Explaining Brazilian Army Presence in the Amazon," diss., Naval Postgraduate School, 1993, for an analysis of Amazonian development projects as justifications for the military's budget and legitimacy.

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Angie Godwin is a Junior Political Science/Sociology major, with a minor in Spanish. She is active in Chi Omega Women's Fraternity, Omicron Delta Kappa Leadership Honor Society, and the President's Student Service Organization. While she eventually would like to study law and travel around the world, Angie currently spends her spare time doing step aerobics and taking photographs for her senior project for the Honor's Program.

The Inhibitory Effects of Crystalline Chicken Egg Albumin Upon the Growth of *Neurospora*

Maria Glaser

ABSTRACT: Crystalline chicken egg albumin is a protein substance known to inhibit certain bacterial growth. The purpose of this study was to determine whether this albumin substance would inhibit fungal growth, as well, and to what extent any inhibition would occur. For the procedure, a strain of *Neurospora crassa* was exposed to solutions of varying concentrations of the albumin in several commercially available grades. Growth of both reproductive and vegetative structures was investigated. The least pure grade of crystalline chicken egg albumin was determined to be the most effective fungal growth inhibitor. Contamination of this albumin grade with other protein substances is believed to be the source of its antifungal properties.

INTRODUCTION: Crystalline chicken egg albumin is a protein product isolated from egg whites. This product is commercially available for laboratory use in several different grades based on purity. Crystalline chicken egg albumin has been shown to inhibit the growth of some sporeforming bacteria. Certain grades of this product were found to be contaminated with other protein substances that are known to be antimicrobial agents (Ashton).

Recent research has suggested that crystalline chicken egg albumin has antifungal properties, as well as antibacterial properties. An assay procedure for environmental pollutants, currently under development, required the introduction of an albumin solution to a growing fungus, *Neurospora crassa*. It was observed that the *Neurospora* ceased to grow after exposure to the albumin (Shew Oct.). This observation was the impetus for the current study.

Neurospora is a fungus of the phylum Ascomycota, classified as such because it produces sexual spores in a sac-like structure called an ascus. Even though *Neurospora* is classified for its sexual reproductive structures, it most commonly reproduces asexually by means of spores called conidia (Deacon 54-55). *Neurospora* produces two types of filamentous growth, referred to as hyphae. A mass of hyphae is a mycelium. Vegetative hyphae are responsible for nutrient acquisition; aerial hyphae are usually associated with reproductive structures, such as conidia. Aerial hyphae arise above the medium in which the organism is being grown (Tortora 297-300). Both reproduction and growth of this organism are rapid, making it ideal for laboratory study. Wild type strains have simple nutritional requirements, needing only a carbohydrate source, mineral salts, and biotin. In nature, *Neurospora* colonizes burnt ground and charred vegetation predominantly (Webster 220).

The purpose of this study was to observe the effects of different grades of crystalline chicken egg albumin upon the growth of *Neurospora* in order to determine what grades displayed the greatest antifungal activity, and at what concentrations each proved to be inhibitory. Preliminary investigation involved the microscale observation of inhibitory effects as evidenced by conidial development or lack thereof. The conidia of *Neurospora* are clearly visible for this type of observation because of their macroscopic size and orange color. Estimates of growth constitute the data for this stage of the study. Further investigation was performed with a microscale procedure comparing vegetative

mycelial masses produced under varying conditions. Both procedures demonstrated the antifungal abilities of crystalline chicken egg albumin.

MATERIALS AND METHODS: The organism used in this procedure was the *Neurospora crassa* strain OR8-1a. Minimal media slants were made up with 2% medium N, 2% sucrose, and 1.5% agar. The slants were inoculated with the test organism and incubated at 25° C for four days to insure adequate conidial growth. A conidial suspension was prepared by introducing sterile water to slants. The suspensions were collected into one tube for dilution.

Microscale Procedure: The crystalline chicken egg albumins used were grade two, grade three, grade five, and an unknown grade. Of these, grade two is the least purified, and grade five is purest. Solutions were made from each of these grades at concentrations of 2% and .5%. A micro-well plate was used for this portion of the procedure. Liquid minimal media, consisting of 2% medium N and 2% sucrose, was prepared for use in the micro-well plate. All eight wells in each of the ten columns received 50 microliters of conidial suspension and 50 microliters of minimal media. Column 1 was designated as the control. The remaining columns received the following supplements:

Column 2 - 50 ml water

Column 3 - 50 ml 2% grade 2 albumin solution

Column 4 - 50 ml .5% grade 2 albumin solution

Column 5 - 50 ml 2% grade 3 albumin solution

Column 6 - 50 ml .5% grade 3 albumin solution

Column 7 - 50 ml 2% grade 5 albumin solution

Column 8 - 50 ml .5% grade 5 albumin solution

Column 9 - 50 ml 2% unknown grade albumin solution

Column 10 - 50 ml .5% unknown grade albumin solution

This plate was incubated at 25° C for 24 hours, then scored for growth and inhibition.

After the first plate was scored, a second trial was per-

formed in microscale using grade 2 albumin only. Solutions were made from this grade at concentrations of .1%, .05%, and .01%. Five columns of a micro-well plate were prepared with 50 microliters of conidial suspension and 50 microliters of minimal media. Column 1 was again the control. The remaining columns received the following supplements:

Column 2 - 50 ml water

Column 3 - 50 ml .1% grade 2 albumin solution

Column 4 - 50 ml .05% grade 2 albumin solution

Column 5 - 50 ml .01% grade 2 albumin solution

This plate was incubated at 25° C for 24 hours, then scored for growth and inhibition.

Macroscale Procedure: This portion of the study was designed to explore quantitatively the inhibitory effects of grade 2 albumin only. Each of twelve 250 milliliter flasks was filled with 100 milliliters of water, to which was added 2 grams of sucrose and 2 milliliters of medium N. This liquid minimal medium was autoclaved before inoculation. Next, .5 milliliters of conidial suspension was added to each flask. Three flasks were used as a control group. To three of the flasks, 1 gram of grade 2 albumin was added to make a 1% albumin solution. Three other flasks received .1 gram of grade 2 albumin to make a .1% albumin solution. The last three flasks received .01 gram of grade 2 albumin to make a .01% solution. All twelve flasks were placed on a shaker apparatus on low power and incubated at room temperature for approximately 56 hours. Agitation in this manner prevents aerial hyphae growth, and thus prevents conidial growth as well. In this manner vegetative growth was isolated for study. After incubation each flask was filtered, using a suction filtration apparatus. The filter paper used was weighed and labelled with the correct albumin concentrations prior to filtration. Mycelial masses were collected on the filter paper. Because the organism had been growing in a liquid environment, 24 hours of drying in an oven was necessary after collection. After the mycelium and filter paper had been dried, each specimen was weighed to determine

amounts of growth and inhibition.

RESULTS: The first microscale procedure, using albumins of grade 2, grade 3, grade 5, and an unknown grade in different concentrations, revealed that grade 2 and the unknown grade exhibited the greatest inhibitory activity, as is shown in Table 1. Because of the similarity of inhibitory action observed in these two grades, the assumption was made that the unknown grade of albumin was grade 2 as well. Grade 3 and grade 5 exhibited inhibitory action, only to a lesser degree than grade 2. No quantitative difference among the three grades was measured. Any difference in the inhibitory action of the two concentrations was not visibly obvious at this point.

Table 1. Results of first microscale procedure.

PLATE COLUMN	ALBUMIN SUPPLEMENT	<i>NEUROSPORA</i> GROWTH
1	none	growth
2	none + water	growth
3	2% grade 2	no growth
4	.5% grade 2	no growth
5	2% grade 3	inhibited growth
6	.5% grade 3	inhibited growth
7	2% grade 5	inhibited growth
8	.5% grade 5	inhibited growth
9	2% unknown grade	no growth
10	.5% unknown grade	no growth

Because grade 2 showed such radical inhibition, the second procedure was directed towards exploring other concentrations of this grade. As is shown in Table 2, there were no concentrations used in this procedure that completely inhibited growth. All three solutions displayed inhibitory capabilities, but no differences among the three were visibly obvious.

Table 2. Results of second microscale procedure.(next Page

PLATE COLUMN	ALBUMIN SUPPLEMENT	NEUROSPORA GROWTH
1	none	growth
2	none + water	growth
3	.1% grade 2	inhibited growth
4	.05% grade 2	inhibited growth
5	.01% grade 2	inhibited growth

Because of the range of inhibitory capabilities present within this one grade, the macroscale procedure was designed so that differences could be quantitatively measured. Albumin solution percentages were chosen at 1%, .1%, and .01%. Table 3 gives a record of the masses of mycelium recovered from each flask. Each albumin solution inhibited vegetative mycelial growth to some extent. In comparison to the control group, the .01% solution inhibited growth only 3%, the .1% solution inhibited growth 27%, and the 1% solution inhibited growth 43%.

Table 3. Results of macroscale procedure.

ALBUMIN CONCENTRATION	MASS IN FLASK 1	MASS IN FLASK 2	MASS IN FLASK 3	AVERAG MASS
no albumin	.185 g	.163 g	.152 g	.167 g
1%	.098 g	.078 g	.109 g	.095 g
.1%	.121 g	.127 g	.118 g	.122 g
.01%	.150 g	.170 g	.166 g	.162 g

DISCUSSION: Grade 2 crystalline chicken egg albumin proved to be the most effective inhibitor of *Nerospora growth*. Grade 2 is the least pure albumin of those tested in this study; therefore, impurities must be the cause of its antifungal capabilities, as they are the cause of its antimicrobial capabilities. The impurity causing inhibition would be a component of egg white not fully separated from the albumin during processing. There are two proteins found in egg white known to have antimicrobial properties—lysozyme and conalbumin (Belitz 406).

Lysozyme was found to be a contaminant of grade 2 crystalline chicken egg albumin in a study done in 1975 (Ashton). It is possible that lysozyme is still a common contaminant of grade 2 albumin; however, two important pieces of information suggest that lysozyme does not factor into this study. First, lysozyme is an enzyme that hydrolyzes the cell walls of Gram-positive bacteria (Belitz 406). It has not been shown to be an antifungal agent. Second, according to Sigma, the biological supply company that produced the albumin, electrophoretic tests and other assays have been negative for the presence of lysozyme in their grade 2 albumin products (Shew Nov.).

Conalbumin would be the only other known possibility as an antifungal agent. A study in 1981 demonstrated its ability to inhibit bacterial growth (Tranter). Belitz and Grosch's Food Chemistry describes it as a general antimicrobial agent (406). Conalbumin destroys microorganisms by depriving them of Fe(III), especially in alkaline environments (Tranter).

If this experiment were to be repeated, improvements would need to be made in the macroscale procedure. Masses found for the mycelium grown in 1% albumin solution are not accurate. When the mycelial masses were filtered from solution, undissolved albumin was recovered along with the mycelium. An attempt was made to remove the most obvious fragments; however, some albumin was left behind, mixed with the mycelium. Both mycelium and albumin were dried in the oven, and both were responsible for total masses measured. In future trials, the albumin should be forced into solution completely before agitation and incubation.

The next step in the investigation of this growth-inhibition factor would be performance of lysozyme and conalbumin assays on grade 2 crystalline chicken egg albumin. Following that procedure, both proteins should be tested to determine which, if either, actually inhibits fungal growth. In addition, further study is warranted on other grades of crystalline chicken egg albumin along the same lines.

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Maria Glaser is a Junior Biology major with a minor in Math.

She is a native of Birmingham, Alabama.

Proton NMR Study of the Relative Strengths of Ortho-Para

Andy Harrell, Ben Roberts,

ABSTRACT: An important tool in the realm of undergraduate learning is access to a working NMR. This type of equipment quickly gives tangible data that can supplement the classroom experience. The first major objective of this project was to tune and bring into working condition Birmingham-Southern College's NMR. Once this phase was completed, the project was expanded to include an experiment designed to use the NMR. This project looked at the relative strengths of -OH, -Cl, and -CH₃ substituents as ortho-para directors on the benzene ring. This experiment resulted in the order listed above, with -OH being the strongest director.

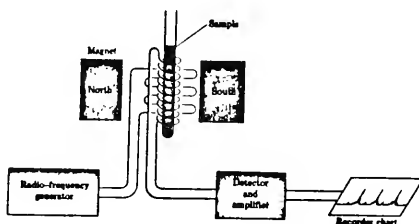
INTRODUCTION: A Nuclear Magnetic Resonance Spectrometer (NMR) has a high level of sensitivity and to function properly must be used and tuned on a regular basis. The Varian EM-360A NMR Spectrometer System owned by Birmingham-Southern College was purchased in approximately 1985. Few sample spectrums from this instrument exist, thus demonstrating that it was not used on a regular basis. Many Organic Chemistry classes have been taught without the use and availability of a functioning NMR instrument. Approximately half of this project consisted

of tuning the NMR. This involved making every type of adjustment available, including such things as the magnetic shunt adjustments and variable resistor changes to improve the homogeneity of the magnetic field. The Varian Operation Manual was followed extensively to make these adjustments. It was discovered that operating an NMR is more than a science; it is an art. We examined a set of electrophilic aromatic substitution reactions with the aid of this NMR. The NMR was used to determine where the substitution had been made on the aromatic ring. The parameters of these reactions started with a 1,2 disubstituted benzene ring and then added a third substituent. The first two substituents were both ortho-para directors. The stronger director would direct the third substituent to a position either ortho or para to itself.

THEORY: A NMR is vitally important to an Organic Chemist because it gives the carbon-hydrogen framework of a compound, which is instrumental in identifying an unknown compound. The most important concept behind NMR theory is that nuclei have a unique property of spin. Hydrogen (a proton) fortunately has this property of spin. Other nuclei possessing this property are ^{13}C and ^{14}N . In fact, any nuclei that has an odd-numbered mass or that has an even-numbered mass with an odd atomic number has this characteristic of spin (McMurry 444). This spinning characteristic can be fully explained only by looking at quantum mechanical theory. For the purposes of this project it is necessary to know only that a proton does possess this spin quality. In the absence of an external magnetic field (designated H_0), these nuclei are randomly oriented. Their direction is constantly changing. These spinning nuclei act as tiny magnetic dipoles and when placed in the presence of H_0 , they interact and align themselves either with or against the externally applied magnetic field. These positions are known as being either parallel or anti-parallel to the external field (McMurry 443). Once the nuclei are aligned, they can be irradiated with electromagnetic radiation,

causing what is known in Organic Chemistry as a "spin-flip" to occur. This spin flip pulls the nuclei from its lower energy state to its higher energy state. Upon the occurrence of this spin-flip, resonance of the nuclei is obtained, which is where the name **nuclear magnetic resonance** originated (McMurry 443). The NMR owned and now in operation at Birmingham-Southern College is based on the theory outlined above. It is a proton NMR and designed only to detect the resonance of hydrogens. This instrument has a permanent magnet with field strength of 14,100 gauss and a range of 60MHz. This instrument, as do most NMRs, keeps the rf value (radio frequency) constant and sweeps the field intensity, H_0 . A basic schematic is as follows:

Figure 1



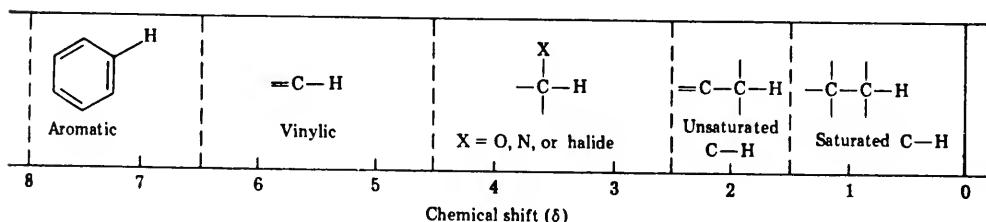
(Figure 13.4 of McMurry 447)

It is important to know, in understanding the theory behind an NMR, that all protons do not absorb at the same field strength. If they did, a NMR would be useless to an Organic Chemist because it would result in only one absorption peak, making it impossible to differentiate between the nonequivalent hydrogen of an unknown compound. But as it is, protons come into resonance and absorb at different field positions according to their location on the compound. When H_0 is applied, electrons form their own magnetic field, thus shielding the nuclei from this external field, H_0 . The resulting field felt is different for each nonequivalent nuclei and can be summed in the following equation:

$$H_{\text{effective}} = H_{\text{applied}} - H_{\text{local}}$$

The terminology behind this idea is called chemical shift. There are several things that affect the chemical shift of protons. This is important to understand before we explain our experiment on ortho-para directors. The first thing affecting chemical shift is the electronegativity of neighboring atoms. If a neighboring atom to a hydrogen is strongly electronegative, it pulls electron density away from the proton. This deshields the proton, requiring less external magnetic field strength to bring the proton into resonance, therefore shifting the peak downfield. The second thing affecting chemical shift is hybridization, or what is commonly known as the 's' character of a compound. For example, CH_4 is sp^3 hybridized whereas C_2H_4 is sp^2 hybridized. The latter example has more 's' character and as a rule is more deshielded; therefore its chemical shift is further downfield. The third thing affecting chemical shift is the p electron effect. If neighboring p electrons are aligned with the external magnetic field, the effect is additive to H_0 , therefore less H_0 is required to bring the specific proton into resonance and the result is a deshielding effect shifting the absorption peak downfield. On the other hand, if neighboring p electrons oppose the H_0 , a shielding effect occurs, requiring more H_0 to bring the proton into resonance, shifting the peak upfield. The following is a diagram of many common chemical shifts for different kinds of protons. The aromatic region became an important area of study as will be seen in an explanation of the ortho- para- directing experiment.

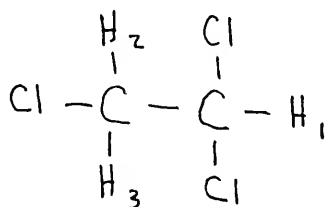
Figure 2



(Figure 13.16 of McMurry 465)

When discussing NMR Spectroscopy, one cannot get a complete discussion without talking about spin-spin splitting or coupling. What exactly is this phenomenon called splitting? Simply it is when a single peak is broken apart into many peaks. Obviously the next question to ask is how this occurs? To begin with, a quick recap of the theory presented up to this point is in order. As stated earlier, when a strong external magnetic field is applied to a system, the nuclei with the property of spin, in this case only hydrogen, will align either with or against the applied field. Recall also that electrons can set up tiny magnetic fields that can shield the nucleus. When two carbons are adjacent to each other, the magnetic field their hydrogens feel is affected by the magnetic fields of hydrogens of the neighboring carbon. The effect is similar to the shielding and chemical shift effects. Look at the example of 1,2,2 trichloroethane (figure 3):

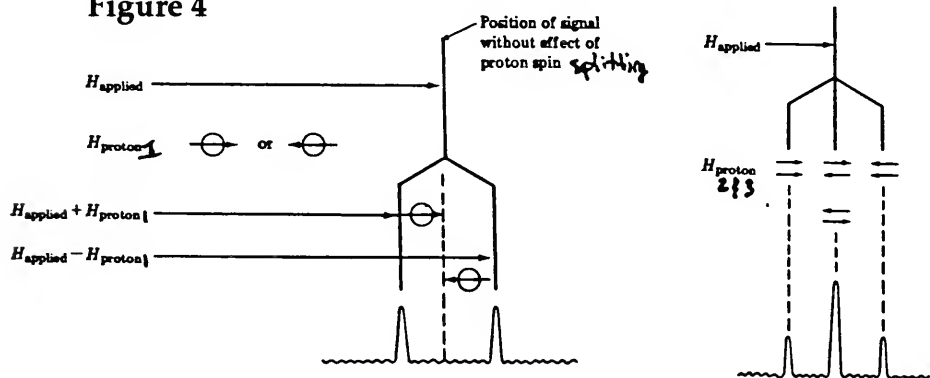
Figure 3



In this example hydrogens 2 and 3 are chemically equivalent. When the applied magnetic field reaches a certain strength, these hydrogens will resonate and give a signal to which the NMR detection device can respond. Coupling occurs because hydrogen 1 can align either with or against the field. When it aligns with the field it effectively adds to the strength of the field that hydrogens 2 and 3 feel. Because of this added power, these hydrogens will resonate at a slightly lower applied field than if there were no interaction. Similarly, if hydrogen 1 is aligned against the field it acts as a shield for hydrogens 2 and 3. It takes a little more applied field to get 2 and 3 to resonate. Since all NMR sig-

nals are a time-averaged signal there will be two peaks of the same intensity representing hydrogens 2 and 3 on the spectrum. A similar analysis of hydrogen 1 will show that hydrogens 2 and 3 can both align with the field, one with and one against (two possibilities for this), or both align against the field. This will result in the signal for hydrogen 1 being split or coupled into three peaks, with the one in the middle of twice the intensity as the one on either side:

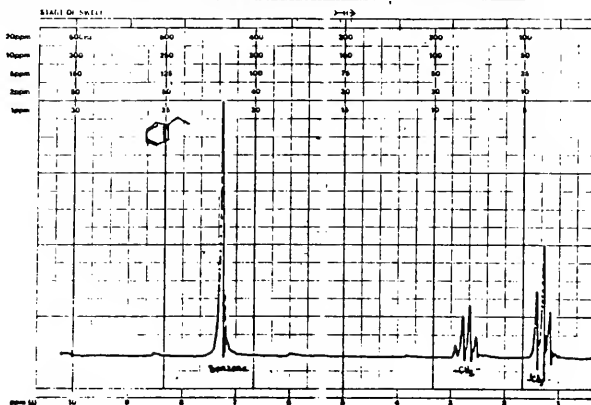
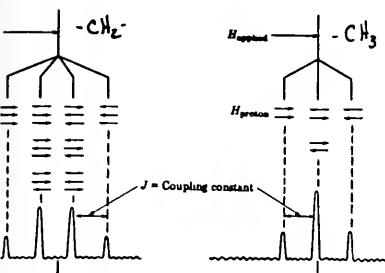
Figure 4



(Figure 13.10 and 13.12 of McMurry)

To further illustrate this phenomenon see figure 5 and its representation of ethylbenzene. The signal for the hydrogens on the $-\text{CH}_3$ will be a triplet as demonstrated above. The signal for the hydrogens on the $-\text{CH}_2-$ will split into a quartet with the two peaks in the middle being three times the intensity of those on either side. A look at the rest of figure 5 will show that there are eight ways the hydrogens of the $-\text{CH}_3$ group can align with respect to the applied external field. A quick look at the pattern that has developed shows that a hydrogen that has n hydrogens on the carbon adjacent to it will be split into $n + 1$ peaks. Conveniently this is called the "n+1" rule.

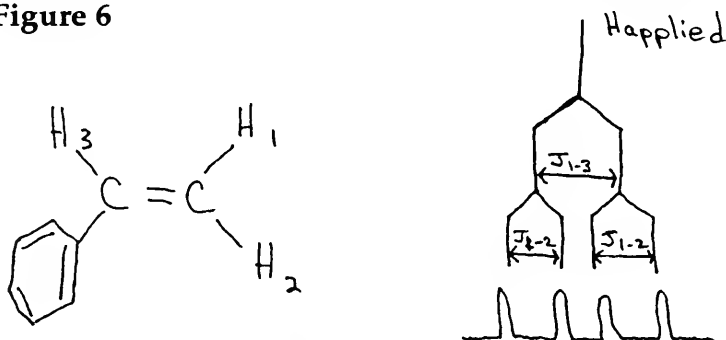
Figure 5



(Figure 13.19 of McMurry 470)

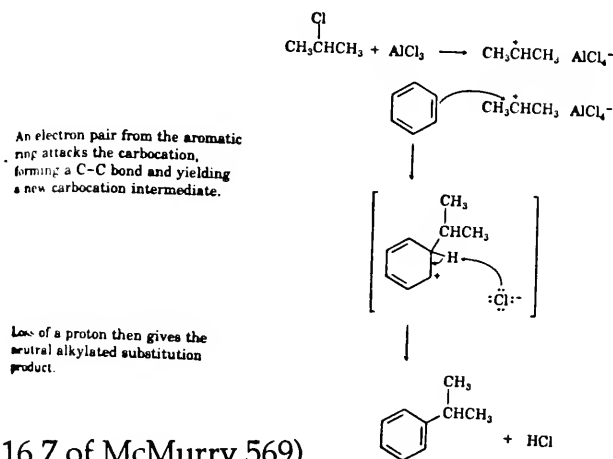
One other important thing to notice is that when a peak is split into multiple peaks there is a constant distance that separates the peaks. This distance is called the coupling constant and is denoted J . J is measured in Hertz, and one interesting characteristic is that J values do not depend upon field strength. Two groups of hydrogens that split each other will both have the same J value (see figure 5). It is important to remember that chemically equivalent hydrogens do not couple with each other, and usually only neighboring protons do couple. The benzene ring is an exception to this rule because other protons on the ring can couple with those that are more than simply a neighbor. In this special case hydrogens that are ortho, or beside each other couple with a constant of about 6-9 hertz, meta (2 carbons away) from 1-3 Hz, and para (3 carbons away) coupling 0-2 Hz. The farther away the protons are the less likely a split will occur, but these coupling constants are still great enough that the splitting can be resolved on a powerful NMR. Sometimes there is more complex splitting than previously described. Figure 6 shows an example where the splitting would be different. Hydrogens 1 and 2 are not equivalent so they actually would split each other. Hydrogen 3 would also split both of these hydrogens. Figure 6 also shows the splitting pattern for hydrogen 1. With these basic principles covered it is possible to predict what a possible NMR spectra would look like.

Figure 6



SYNTHESIS OF PRODUCTS: In 1877 Charles Friedel and James Crafts discovered that a benzene ring could be alkylated in a reaction consisting of a benzene ring and an alkyl chloride in the presence of aluminum trichloride. What they had discovered is now called the Friedel-Crafts alkylation. This type of reaction is an electrophilic aromatic substitution. This project uses this reaction to synthesize the desired compounds to run on the NMR. Figure 7, representing the reaction of benzene and 2-chloropropane, illustrates how this reaction works:

Figure 7



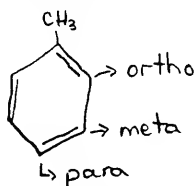
(Figure 16.7 of McMurry 569)

As is observed in the above figure, the AlCl_3 complexes with the alkyl chloride to form a carbocation. The benzene ring then

carries out an electrophilic attack upon this carbocation to form a new carbocation intermediate. The AlCl_4^- complex takes off the proton to neutralize the carbocation reforming the benzene ring, HCl and also giving back AlCl_3 , the catalyst.

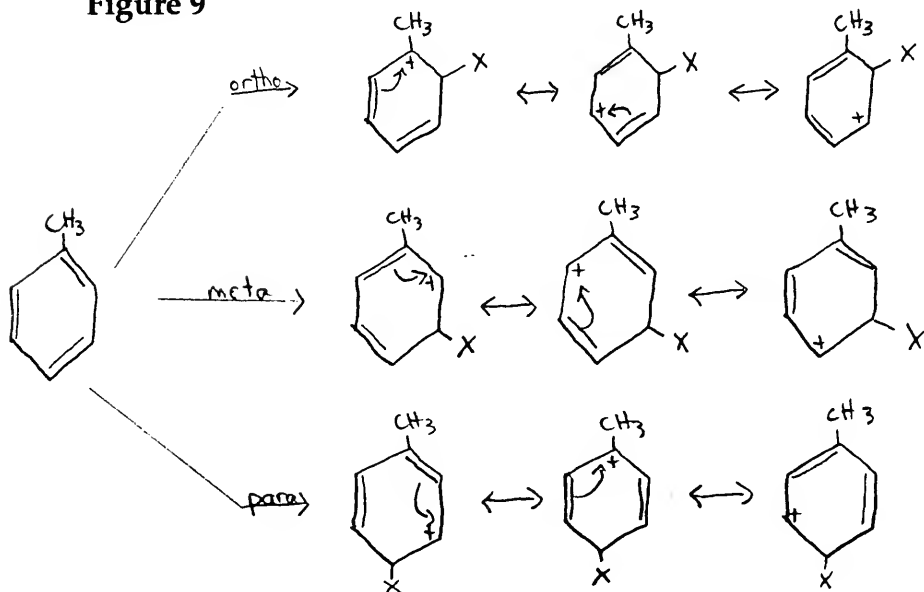
One final area needs briefly addressing before we delve into the experimentation of ortho- para- directors. This is a discussion on the terminology of ortho-, meta-, and para- positions on a benzene ring and ortho- para- directors specifically. The nomenclature of the positions on a substituted benzene ring are as follows:

Figure 8



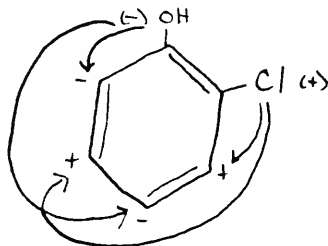
When adding a second substituent, for example, on a monosubstituted benzene ring, it is more strongly directed to one of these positions than the others. The best way to explain this is to look at the resonance structures for adding a second substituent to toluene:

Figure 9



As one can see, only substituents at the ortho- or para- positions yield a positive charge located at the $-\text{CH}_3$. These are the most stable resonance structures because the $-\text{CH}_3$ more efficiently stabilizes the positive charge. Notice that when a substituent is at the meta- position, the positive charge does not lie at the $-\text{CH}_3$; therefore these resonance structures are less stable. As can be seen in the above example, $-\text{CH}_3$ is an ortho- para- directing substituent. Other ortho-para directors are halogens (Cl) and $-\text{OH}$. There also exist meta directors such as NO_2 , but they have no part in our project. Ortho-para directors are important in our experiment when working with a disubstituted benzene ring whose substituents are both ortho-para directors and are ortho to each other. These substituents direct to different positions. When a third substituent is added, it will be directed ortho or para to the strongest directing, preexisting substituent. The following diagram visualizes this scenario:

Figure 10



EXPERIMENTAL SECTION: As previously mentioned, much of the work done on the NMR itself consisted of tuning the instrument so that it would perform adequately. This required making adjustments on the magnetic shunts, spinning rate, adjustable resistors, X, Y, and Z Homogeneity adjustments, Curvature, Phase control, Power, etc. A tedious commitment to each of these finally resulted in the NMR's producing quality spectrums.

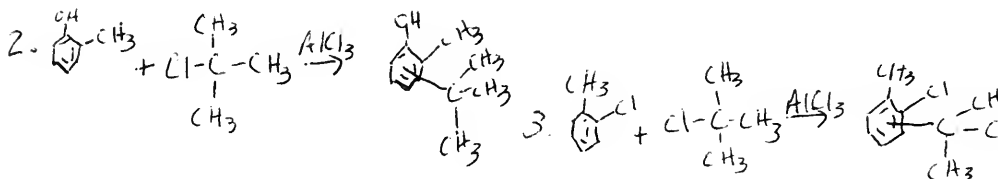
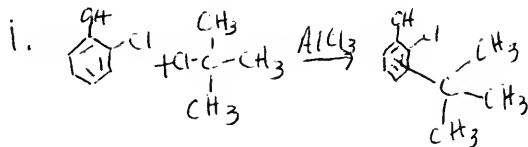
Design: This experiment was carefully designed in order to insure efficiency as well as provide experimental data to resolve the question of stronger director. Once again the purpose

of the experiment was to see which of the chosen directors under specified conditions would be the strongest ortho-para directors. The general type of reaction to be used was a Friedel-Crafts alkylation. In this reaction 2-chloro-2-methylpropane was the alkylated chloride. The reason for using such a big group was to limit the possibilities for the substitution. Since there were already two substituents on each ring, a bulky third substituent would probably go para to one substituent or the other but not ortho due to steric hindrances. In this scenario, there would only be one product, a substitution at the para position. The key to the whole experiment is that the two ortho-para directors must be ortho to each other. In this way, ortho position to one of the directors would be meta to the other one. Wherever the substituent goes determines which of the directors is the strongest. One other part of the design that is important is that the disubstituted benzene ring starting material must be the limiting reagent. This way all of it would be used in the reaction and the only substances left over would be the final product and extra 2-chloro-2-methylpropane. The extra 2-chloro-2-methylpropane can be easily removed by boiling since its boiling point is 52-55°C. The other starting material, the disubstituted benzene rings, all had boiling points of 150°C+.

Procedure: Most of our experimentation centered around producing the products that were eventually tested on the NMR. The three starting materials used were: 2-Chlorophenol, O-Cresol, and 2-Chlorotoluene. Each of these experiments were performed in the same manner using the following procedure. Microscale quantities were used to give sufficient product amounts. Allowing the starting material to be the limiting reagent in each trial, 0.8 mL of the starting material we mixed with 1.0 mL of 2-Chloro, 2-methylpropane (t-butyl). These were allowed to cool on ice for a minimum time. Next, 0.04 grams of Aluminum Chloride (AlCl_3) was added to begin the reaction. After mixing well in a small test tube, the product we allowed the product to form while the tube rested at room temperature for twenty minutes. This gave a prod-

uct to test on the NMR, but it needed to be purified because t-butyl group remained mixed with the product. Many methods of purification were used, but the best seemed to be simply boiling the mixture. The boiling point of the t-butyl is much lower than that of any of the possible products; therefore it would boil off before any of the others. This boiling was done under a vacuum. This method of purification proved to be successful, for these products provided clean spectras when tested on the NMR. Before running the actual spectrum, we added a deuterated solvent (CDCl_3) and Tetramethylsilane (TMS). The three reactions are as follows:

Figure 11



RESULTS AND DISCUSSION: The results of this experiment come chiefly from the spectras of the products obtained from the NMR. One of the first steps in determining what the products actually were was to look up spectra of all the possibilities. The Aldrich Library of NMR Spectra was referenced to find any available spectra. This search provided a spectra for comparison for possible reactions with chlorophenol and o-cresol but not chlorotoluene. The next step in preparing to analyze the product was to obtain a spectra that included all of the starting materials, unreacted. Once this process was completed the synthesis reactions could be run and the spectra for the product obtained. A detailed comparison of the product spectra and the starting materials allowed us to determine if a reaction did in fact occur. Once we determined that a reaction had occurred, we compared the spectra of the product with the possibilities from Aldrich for con-

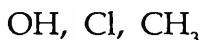
firmation of our analysis.

Reaction 1 was 2-chlorophenol. Figure 12 shows the spectra we obtained followed by the Aldrich spectra. Reaction 2 was the o-cresol. Figure 13 shows the comparison of our spectra with the Aldrich spectra. Both of our spectra follow closely to the spectra presented in Aldrich. From these spectra we concluded that for reaction 1 the -OH group took priority as the strongest director since the t-butyl group substituted para to it. In reaction 2 the -OH again took priority as the stronger director by directing the t-butyl group para to it. Thus far our study has shown that the -OH is the strongest director of the three examined under these conditions.

Reaction 3 was used to resolve the problem of whether the Cl or the CH_3 is the stronger director. Figure 14a shows the spectrum obtained for the chlorotoluene. As mentioned previously, we could not find a spectrum in Aldrich to compare; therefore, in order to support our speculations, we resorted to quantum mechanical calculations. The basis of these calculations were found in The Journal of Chemical Education and provided a simulated spectrum for comparison. The coupling constants and chemical shifts that were used in these calculations were rough estimates based on a disubstituted system. Our system was trisubstituted, and therefore we could reasonably expect the actual spectrum to be slightly different than the simulated one. There could be more splitting than we calculated. The following simulated spectra give the possibilities for the t-butyl group being substituted para to the Cl (14b) and also para to the CH_3 (14c). In this comparison 14b, representing para to the Cl, more closely emulated the actual spectrum. From this evidence we expect that the t-butyl group is para to the Cl, making it the stronger director.

CONCLUSIONS: From this work we were successful in tuning the NMR so that it would give proper spectra on standard samples. Again this was a major part of this project and through it we learned how to operate the NMR at Birmingham-Southern College. Phase two of our project consisted of our synthesis reac-

tions. From these reactions and the evidence provided from the spectra obtained on the NMR and Aldrich, we can conclude that the order of the ortho-para directors from strongest to weakest is as follows:



In order to provide further evidence for these findings, future research could include using different reactions with the same starting groups. In addition, Birmingham-Southern College is in the process of ordering computer programs that will both simulate NMR spectra and process information through the quantum mechanical calculations. Our calculations were one iteration because of the tediousness and time required. A computer program would be able to quickly do many iterations using the data from the previous iteration in order to provide a more accurate prediction. Overall we would say that our research was a learning experience and a success.

We feel that the results of our project will benefit the Chemistry department at Birmingham-Southern College in a myriad of ways. Now that the NMR is properly operating, it can be used by the undergraduate Organic Chemistry classes and by research teams in the future. Our results from the actual experiment can also supplement the material used by these classes. (Please see the graphs which follow the paper.)

ACKNOWLEDGEMENTS: We would like to thank Dr. Clyde Stanton for his guidance and instruction throughout the research. His support is gratefully acknowledged. We would also like to say a word of thanks to his wife, Dr. Regina Stanton, for her input. Richard Collison provided much insight for our research as well. The project would not have been complete without the jovial support of Dr. Craig Lagrone.

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Andy Harrell is a Junior Chemistry major with a Biology/Math minor. He plans to attend medical school. He is from Meridian, Mississippi and thinks everyone should see the azaelias there.

Benjamin W. Roberts is a Junior at Birmingham-Southern College majoring in Chemistry, with minors in both Biology and Mathematics. His interests are in pre-health with plans of attending medical school. He is originally from Andalusia, Alabama, where he attended high school and his freshman year of college at Lurleen B. Wallace Junior College.

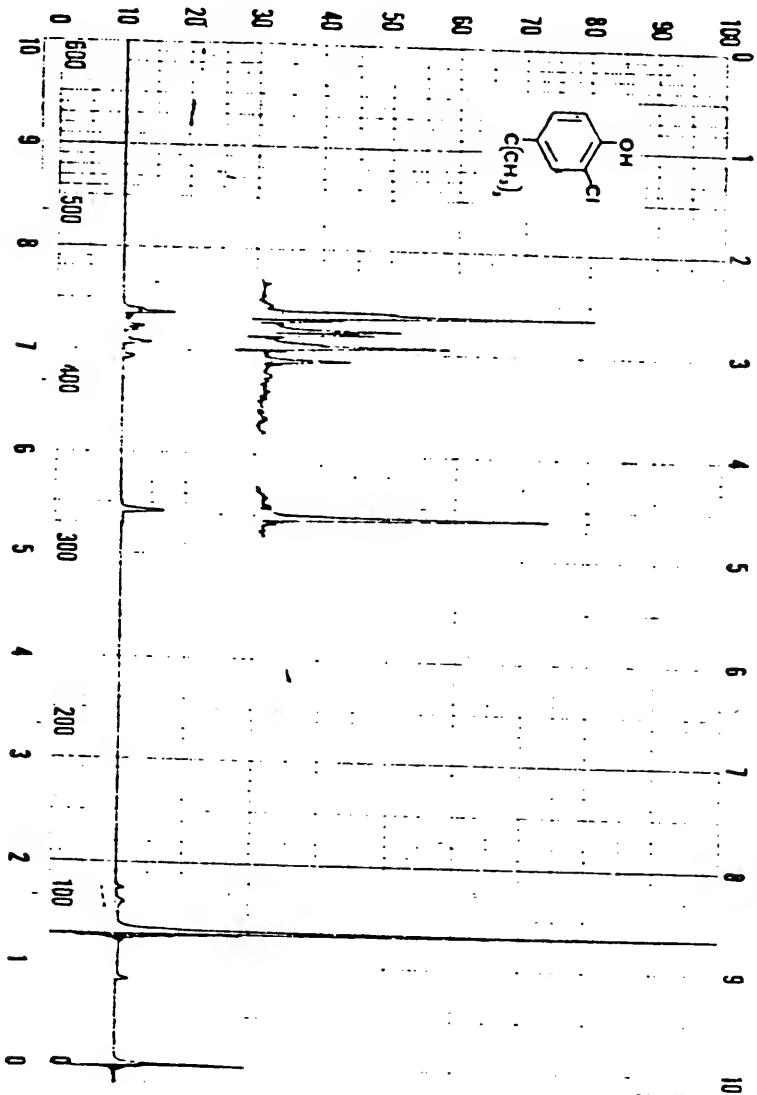
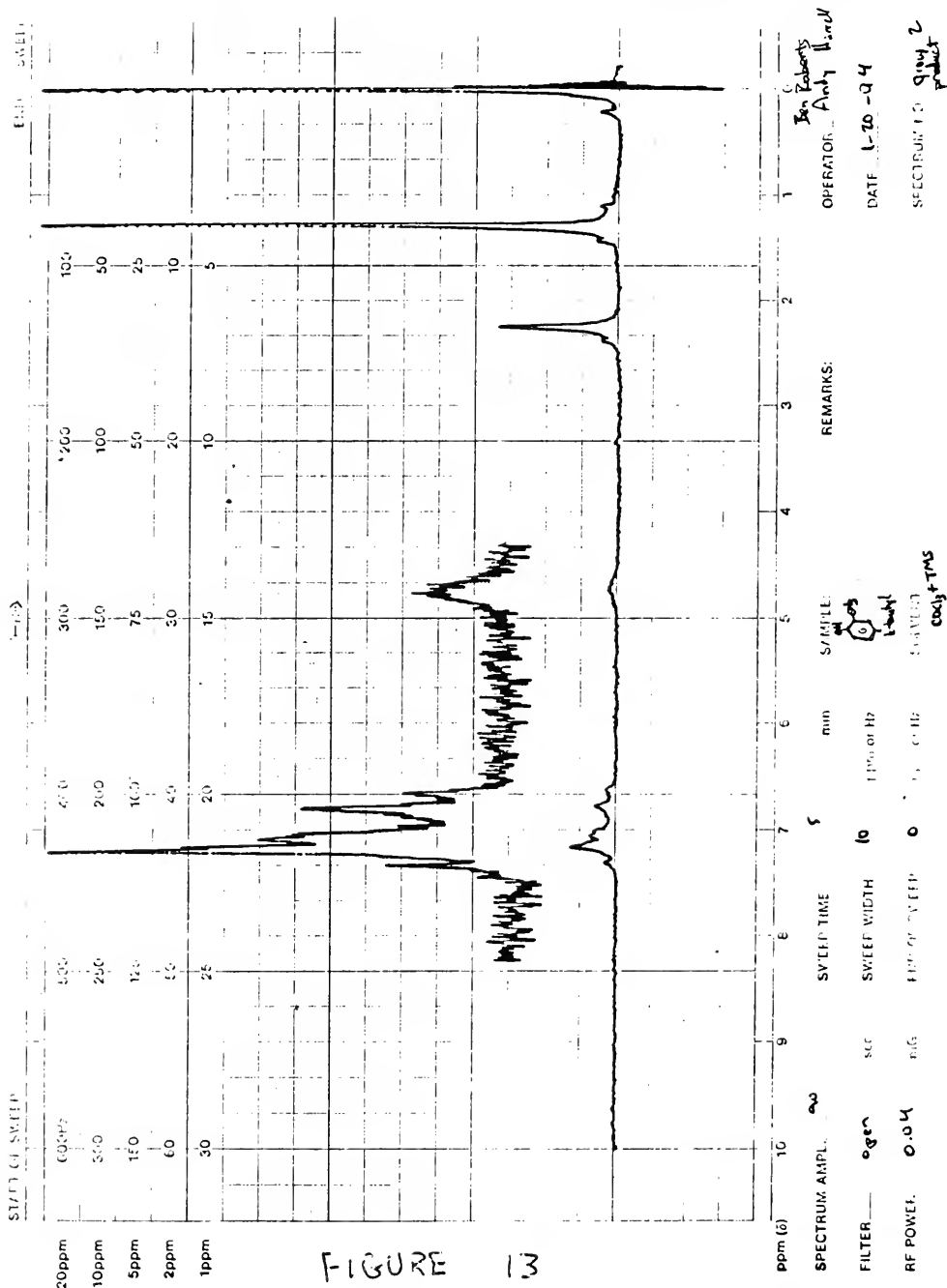


FIGURE 12 cont.



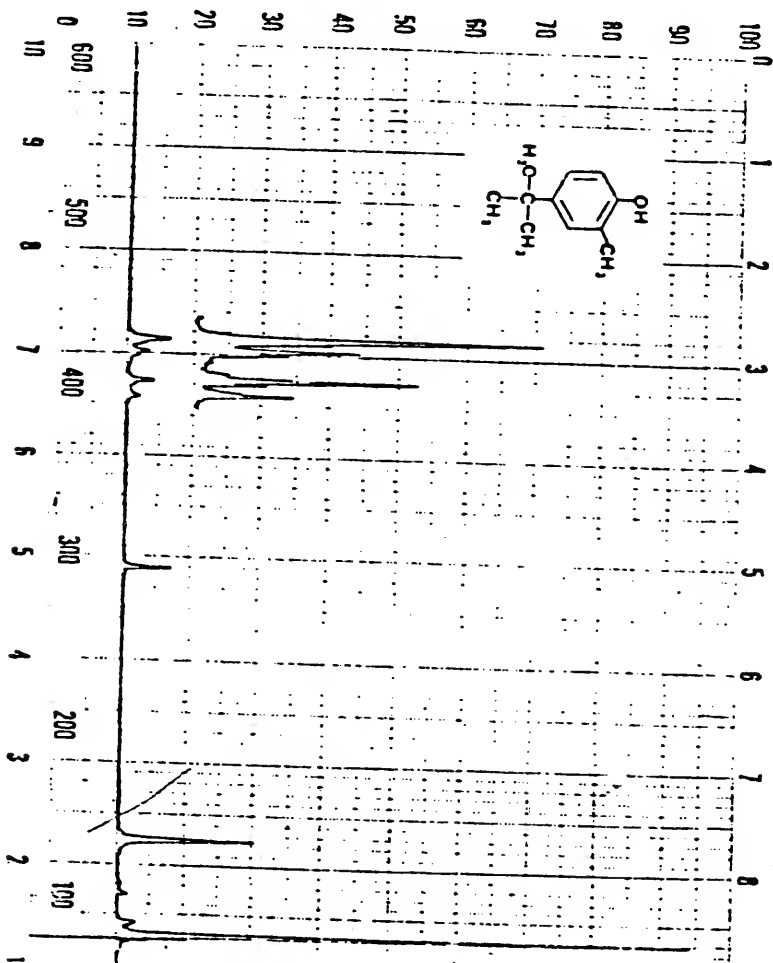


FIGURE 13 cont.

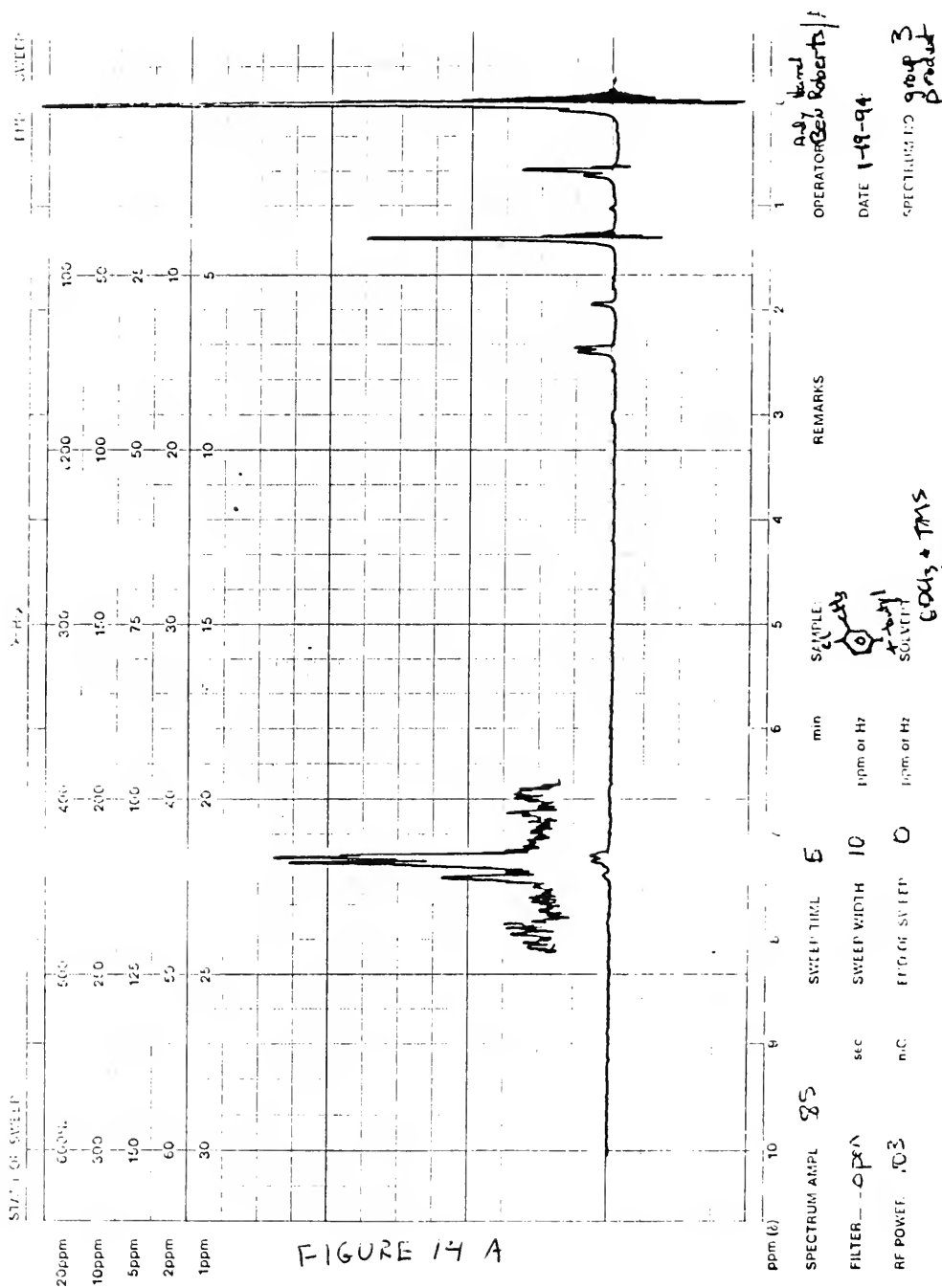



FIGURE 14 A

1
1
ADJ. CLERK
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C. J. WILLIAMS
page 3

SAMPLE	SOLVENT	REMARKS
	GOLS + THS SOLVENT	

ppm (δ)	10	4	0	6
SPECTRUM AMPL	25			
FILTER	— OPEN			
RF POWER	.03			
		SEC		
			SWEEP WIDTH	10
			SWEEP TIME	5
				min
				1-μm, or Hz
		mC	FT/CM SWEEP	0
				1-μm, or Hz

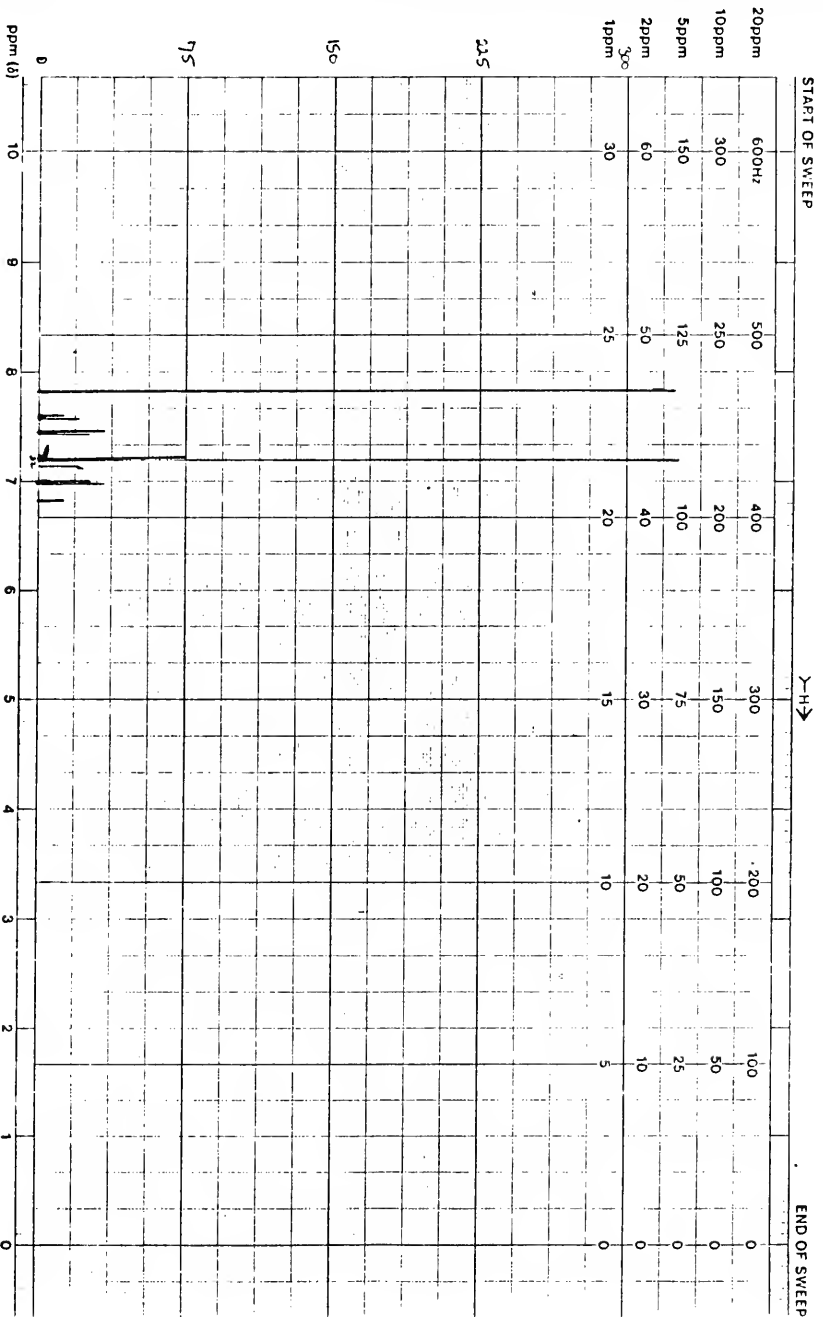
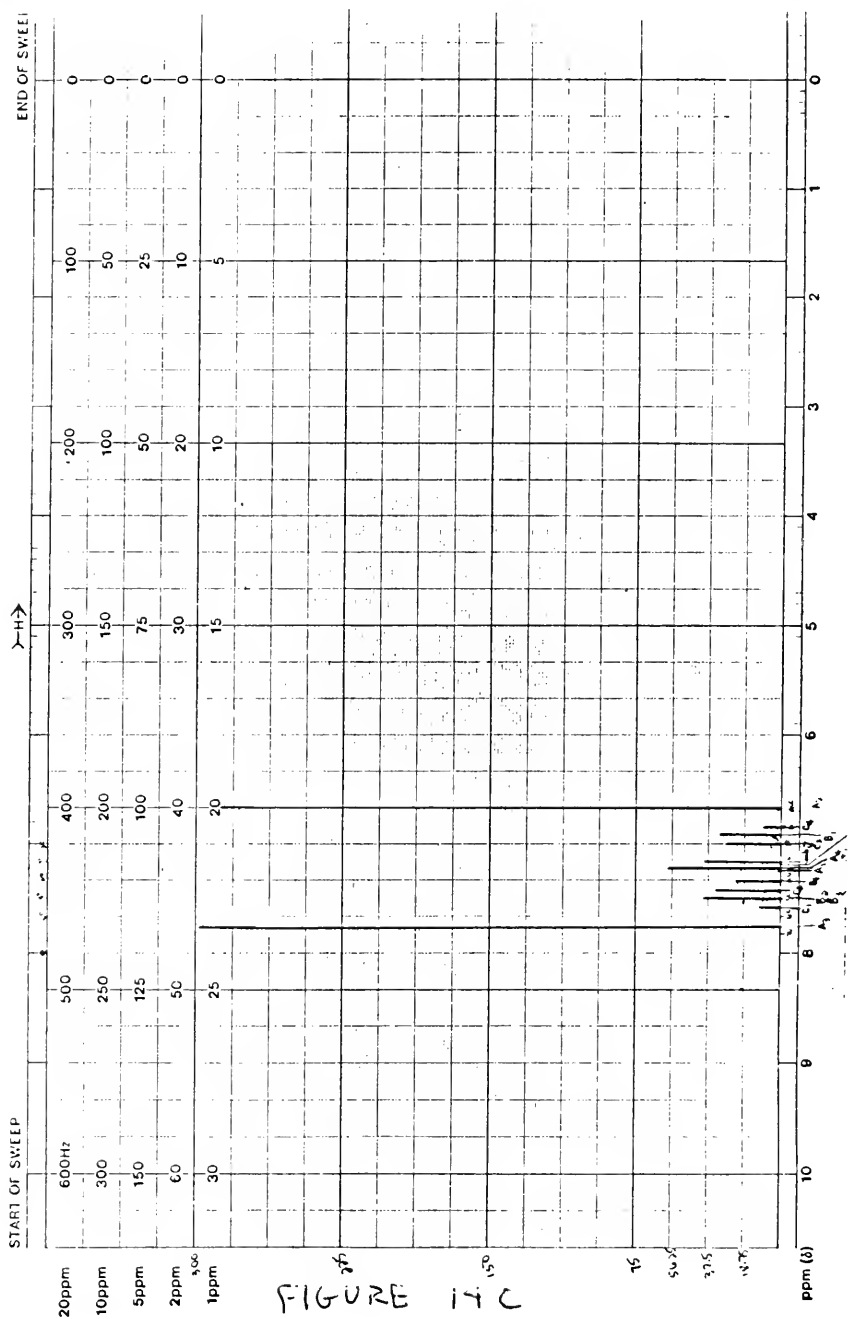


FIGURE 14 B



Patriarchal Family Structures in *Death of a Salesman* and *Cat on a Hot Tin Roof*

Emily Comer

Literature often reflects the socio-political systems of the time in which it is written. In two contemporary American plays, Death of a Salesman and Cat on a Hot Tin Roof, the patriarchal family structure is dramatically revealed.

According to feminist literary critic Kate Millet, the imbalance of power within the patriarchal system is a direct result of traditional perceptions regarding biological differences between men and women. Millett observes that, throughout history, men have been considered stronger and more aggressive than women because the male sex organ is larger and more visible than that of the females ("Sexual Politics" 137). Millett points out that, in literature as well as in society, women are presented as passive creatures, dominated and controlled by the men who actively seek sexual gratification from them (138).

The patriarchal political system employs a male as head ruler of his kingdom. Following this model, the patriarchal family grants the husband-father the title "head of household" Theory 33). As Millett notes, the word *famulus* is Latin for "domestic slave, and *familia* is the aggregate number of slaves belonging to one man" ("Sexual Politics" 124) . Therefore, by the traditional

definition, a family consists of a man and the wife and children that he owns. Contemporary families still operate under similar assumption concerning ownership. For example, when a woman marries, it is standard practice that she appropriate the last name of her husband, move into his home, and "exchange ... [her] domestic service and (sexual) consortium in return for financial support" (35). Also according to Millett, the traditional patriarchal society declares that children are not legitimate unless they are "bough into the world" with a man (35). Therefore, mothers and children are "primarily or ultimately dependent upon the male" for societal acceptance (35).

According to Millett, the family and the patriarchy emulate and support one another, encouraging members to "adjust and confirm" to certain "expectations and guidelines" that are set down by each establishment (*Theory* 33). Because the family is itself a patriarchal structure, patriarchal values are practiced and passed down from generation to generation. In fact, Kate Millett says that "patriarchy's chief institution if the family" (33). Thus, there are three main elements at work in the patriarchal family structure. First, the male "head of household" is responsible for setting the rules and providing financial support for his family. Second, subordinate to men, women are the persons assigned the duty of caring for the home and children. Last of all, a father in patriarchy is responsible for apprenticing his children to his value system and establishing a line of heirs either to his property or his way of life.

Arthur Miller's *Death of a Salesman* and Tennessee Williams' *Cat on a Hot Tin Roof* are two American plays in which the patriarchal family structure is evident. The two plays are centered on similar families, both exhibiting relationships between husbands and wives and father and sons that clearly indicate a patriarchal system in operation.

One component of the patriarchal family is the dominant position of the husband-father. The wife-mother plays the subordinate role in the family, taking a second seat to her husband,

while supporting his decisions, caring for his home and children, and providing him with emotional and sexual care. Within patriarchy, the wife is treated as the property of the husband.

In Miller's Death of a Salesman, Willy Loman is a traveling salesman who has lived his entire life in fruitless pursuit of the American Dream. His wife Linda is portrayed as a subservient woman who lives mainly to support her husband. An unobtrusive person, Linda's statements in the play are described as careful, delicate, helpful, or reserved (Miller 1002). It is Linda's position in the family to care for the house and their children, while abiding by Willy's laws and going along with his falsified vision of himself as a powerful force in the world of sales. Linda tends to Willy's needs and encourages his endeavors. She constantly offers to bring him items that might "soothe" him, such as some aspirin or a sandwich made with a "new king of American-type cheese" (1003).

On one occasion, when Willy tells his wife the small amount of money that he has made after a sales trip, Linda still believes in him, saying, "Well, next week you'll do better" (Miller 1009). Linda tells Willy what he wants to hear, what they would both like to believe but is most likely untrue. When Willy is on the verge of coming to terms with the reality of his failure as a salesman, Linda reels him back to the dream world he has created for them. In this instance, Willy admits that "people don't seem to take to me . . . They seem to laugh at me" (1009). Instead of working out why Willy has these problems, Linda responds the way she is expected to respond as his wife: "h, don't be foolish . . . Why would they laugh at you? Don't talk that way, Willy" (1009). Through their joint suppression of the truth, the couple remains in a state of ineptitude, believing in the lies that Willy has chosen for them both. They find security in the lies because they have lived with them for so long.

Linda's self-identity is enveloped in her role as wife to Willy and mother to his sons. Linda tells her older son, Biff, "If you don't have any feeling for [Willy], then you can't have any feeling

for me" (Miller 1015). Even Willy's description of his wife is centered on himself. He refers to her as his "foundation and [his]support" (1004).

Linda knows that Willy gets his weekly money from his friend Charley, not from sales. She sees that Willy is washed up and knows that he is trying to kill himself, but she refuses to "insult him" by talking with him up front about his problems. (Miller 1016). and cannot let Willy see that he has failed his family. She says of Willy: "He's the dearest man in the world to me, and I won't have anyone making him feel unwanted and low and blue" (1015).

Willy describes his role as husband and father as the one who is supposed to "Make a living for" Linda and the boys (Miller 1010). He leaves his wife at home each day, planning to go out and win some deals so that he may be the provider for his family.

As its patriarch, Willy wants to set all the rules and make all the decisions for his family. Willy does not allow Linda to have input in his dealings with their two sons. When Linda attempts to get a word in, Willy yells for her to stop interrupting him. When Linda tries to speak out of turn, he humiliates her. However, when she is hanging on his every word and need, Willy can tell her, "You're the best there is, Linda, you are a pal, you know that?" (Miller 1010).

Similar situations are presented between the characters of Big Daddy and Big Mama in Williams' Cat on a Hot Tin Roof. Even the names they go by are definitive of their family positions. Big Daddy is the dictator of his family, the provider of wealth, and the owner of a large piece of valuable land. Big Daddy, the revered patriarch of his home, declares, "I made this place!" (Williams 961). This statement reveals Big Daddy's feelings of ownership over the plantation and his wife and sons, Gooper and Brick. One example of Big Daddy's control is connected with his realization of Brick's alcoholism. Big Daddy blames himself for not exerting enough force in Brick's life when he says, "This shows how I . . . let things go" (967). Rather than blaming Brick for

Brick's problem, Big Daddy is disgusted with himself for falling down on his job as ruler of the house.

After the doctors falsely report to Big Daddy that he is not dying of cancer, but that he has a "spastic colon" instead, Big Daddy reprimands Big Mama for stepping out of her place as obedient wife during the time that he thought he was ill (Williams 965). In front of the family, Big Daddy says to his wife, Didn't you have an idea I was dying of cancer and now you could take control of this place and everything on it? . . . I got that impression . . . [with] you loud voice everywhere, your fat old body butting in here and there!" (961). He is practically accusing his wife of wishing he were dying so that she could "take over" the place. Big Daddy, in an effort to reinforce his position as provider and ruler, shouts at Big Mama, "I made this place! . . . I did all that myself with no goddam help from you, and now you think you're just about to take over, . . . [but] you are not just about to take over a God damn thing" (961). It is Big Daddy's perception that he has built this plantation into the financial success it is today and that he has done this completely by himself, so Big Mama should remain in the background and forget about having any influence over the way the place is run. Big Mama's role in this family is to sit quietly by, not bothering anybody, but just living for Big Daddy. When she begins to become too noticeable, Big Daddy silences her with his biting words.

Like Linda Loman, Big Mama's primary occupations are with her husband's well-being and her need for his attention. Big Mama wants to behave as a dedicated wife and mother; however, she is rejected by the family. Her constant ploys to gain attention elicit great annoyance from Big Daddy, rather than admiration. Because Big Mama is so often ignored by her husband, many of her lines are spoken "quickly," as if she must jump in order to say anything that Big Daddy might hear. However, Big Daddy is usually found "cutting her speech" and ignoring her, whether or not she butts in on his conversations (Williams 960).

Big Daddy acts as if Big Mama is an intruder who just hap-

pens to be bobbing and twittering around him all the time. Even when Big Daddy tells his wife strait forwardly that he no longer believes that she loves him, she responds by saying, "You don't mean that" (Williams 961). Big Daddy has fallen out of love with Big Mama and out of interest with most of his family, except Brick. However, Big Mama refuses to accept these truths, providing the family with explanations such as this one: Big Daddy "loves his family, he loves to have them around him, but it's a strain on his nerves. He wasn't himself tonight" (975).

A related theme of patriarchy found in both plays is the general disrespect for women in marriage. Adulterous actions and thoughts are an ultimate expression of power in the patriarchal family when a woman cannot be granted control over her husband's faithfulness. The fathers in both plays either have an affair or talk about having one. In Death of a Salesman, Willy Loman has an affair with a woman who claims that she will put him "right through to the buyers" (Miller 1010). When Willy's son, Biff, catches the woman in a hotel room with his father, Biff begins to cry. Willy responds as if Biff has no right to be upset by what he was witnessed, telling his son, "How dare you cry! Now look, Biff, when you grow up you'll understand about these things . . . You mustn't overemphasize a thing like this" (1035). Willy treats the matter as though it is a normal part of a man's life to cheat on the woman he marries.

Although it is not mentioned that Big Daddy has ever committed adultery in the past, he does confess to his son Brick that because he no longer thinks that he is dying, he is now "contemplating . . . pleasure with women" (Williams 965). Big Daddy calls his "desire for women" and "admirable" trait for a man who is sixty-five years old, adding, "I let many chances slip by because of . . . scruples, convention—crap . . . All that stuff is bull, bull, bull! . . . I'm going to cut loose and . . . have me a ball!" (965). Big Daddy shows no respect for Big Mama, though she has been his wife for forty years; instead, he openly plans to seek sexual relations outside of their marriage.

A second element of the patriarchal family is the preoccupation with the passing down of values and property to children. According to Kate Millett, "the chief contribution of the family in patriarchy is the socialization of the young . . . into patriarchal ideology's prescribed attitudes towards the categories of role, temperament and status" (Theory 35). Children are conditioned by their parents to behave in accordance with the patriarchal structure. Daughters are raised to be wives and mothers, persons who are passive and do not interfere with the business of men. Sons are raised to become men like their fathers—bread-winners with a dominant position in the home. In the patriarchal family, sons learn the values of their fathers and the necessity for perpetuating the family ling.

In Death of a Salesman, Willy Loman struggles to pass on to his sons the importance that popularity and good looks hold in the business world. Willy gives his sons this advice: "The man who makes an appearance in the business world, the man who creates personal interest, is the man who gets ahead. Be liked and you will never want" (Miller 1008). Willy's sons are raised to believe that to lie, cheat, or steal their way to the top is perfectly acceptable, as long as they remain "well-liked" (1008).

It is also from Willy that the boys are taught how women are treated in patriarchy. When Biff is unable to calm down after discovering the woman in Willy's hotel room, his father tries to explain himself by saying, "she's nothing to me, Biff. I was lonely, I was terribly lonely" (Miller 1035). When the other son, Happy, is an adult, he treats women in a similar fashion: "I get . . . [women] any time I want, Biff. Whenever I fell disgusted . . . I just keep knockin' them over and it doesn't mean anything" (1006). Sex is an act of aggression and power to both Willy and Happy, rather than an expression of love between two people.

It is interesting to note that the son to whom Willy gives the most attention is the one who turns out the least like Willy in the end. Biff is thirty-four years old when the play opens. He has never gone to college and he has no career yet, much less any

direction in his life. Biff tells Happy, "I don't know what the future is. I don't know what I'm supposed to want" (Miller 1005). He has yet to "find himself" (1003). Willy cannot understand Biff's rejection of his value system, and he is troubled because Biff has not settled down. It disturbs Willy that "in the greatest country in the world a young man with such person attractiveness [as Biff], gets lost" (1003). By contrast, Willy is not concerned with his younger son, Happy, because he is following in Willy's footsteps. Happy has turned out much like Willy, a dreamer with a job in sales, who takes bribes and sleeps around with women, even with some of his co-workers' fiancées (1006).

Willy talks to Linda about the intangible dream that he wants to pass on to his sons, confessing his fear "that I won't make a living for you, or a business . . . for the boys" (Miller 1010). Linda reassures Willy in her usual way by telling him, "few men are idolized by their children the way you are" (1010).

After Willy's suicide, his dream has been passed down to Happy, but not to Biff, who sees that Willy's dream is futile. Biff was rudely awakened to Willy's faults when he caught him with the woman in the hotel; however, Happy continues to believe in his father and the need to carry on his dream. At the funeral, Biff says of his father, "He had the wrong dreams . . . He never knew who he was" (Miller 1040). To Biff's assessment, Happy responds defensively: "He had a good dream. It's the only dream you can have—to come out number one man. He fought [for] it out here, and this is where I'm gonna win it for him" (1040).

The patriarchal concern with legacy is also a subject of great importance for the Pollitt family in Cat on a Hot Tin Roof. Big Daddy spends a lot of time debating which of his two sons will inherit his vast wealth. He reports to Brick that he is worth "close on ten million in cash and blue-chip stocks, outside . . . of twenty-eight thousand acres of the richest land this side of the valley Nile" (Williams 963).

Big Daddy wants to leave the place to Brick because he is closer to Brick than he is to Gooper. Brick and Big Daddy are friends

because they can tell "each other the truth" (Williams 974). Brick possesses the charm that Big Daddy once did; however, some of Brick's attitudes frustrate Big Daddy a great deal. For example, Brick did not inherit Big Daddy's tolerance of homosexual behavior. Brick is homophobic, describing homosexual activity as dirty, disgusting, and "unnatural" (971). And since the death of his homosexual friend Skipper, Brick has become an alcoholic causing Big Daddy to worry over leaving his property in irresponsible hands. Another concern for Big Daddy is that, so far, Brick and his wife, Maggie, have not produced any children. More than once it is mentioned how much it would please Big Daddy if Brick would continue his line. Big Mama tells Brick that it would be Big Daddy's "fondest dream come true . . . [if you would] give him a child of yours, a grandson as much like his son as his son is like Big Daddy" (981).

Big Daddy's older son, Gooper, has become a lawyer who, together with his wife Mae, has five children and is expecting a sixth. Gooper and Mae share a powerful desire to inherit Big Daddy's wealth when he dies, and they use their children in an attempt to sway Big Daddy's favor to their side. Mae sends her children to sing songs to Big Daddy and entertain him every way possible. Maggie accuses Mae of parading her "no-neck monsters" around like a bunch of "animals of display at a county fair" (Williams 943). However, all of this production never pays off. For some reason, Big Daddy just does not like Gooper. Gooper says that he has "resented Big Daddy's partiality to Brick ever since Brick was born, and the way I've been treated like I was just barely good enough to spit on and sometimes not even good enough for that" (979). Big Daddy's favoritism for Brick is obviously no secret within the family.

Concerning the dilemma over his will, Big Daddy tells Brick: "I couldn't make up my mind. I hate Gooper and his five same monkeys and that bitch Mae! Why should I turn over . . . [my] land . . . to not my kind?—But why in hell, on the other hand, Brick—should I subsidize a . . . fool on the bottle?" (Wil-

liams 969). It is obvious that Big Daddy wants to leave his property to Brick, but Brick must first show some interest in embracing patriarchal values. So far, Brick has refused to participate in the flow of the system that reared him. He does not seem to care about making a living, raising a family, or acting as head of a household (969).

Cat on a Hot Tin Roof ends a triumph for the patriarchy. Big Daddy's decision to leave the place to Brick is cinched with Maggie's announcement that she is expecting a child. The play closes with Maggie taking a disinterested Brick to bed with her, for the purpose of conceiving the child who will carry on the Pollitt family name.

Patriarchal values have been prevalent in political and social systems throughout history; but, according to Kate Millett, the family remains the most influential of all patriarchal structures. The patriarchal family, consisting of a male "head of household," his wife, and his children, enforces and supports a patriarchal government by reflecting its principles. As the patriarch of his home, it is the duty of the husband-father to lay down the law and provide financial stability. The wife-mother's job is to support and tend to the needs of her husband and children. Finally, it is also the father's responsibility to instill within his children those values that he believes in, including the importance of family lineage. As the patriarchal family structure has played a prevalent role in history, it does the same in literature (Feminist 138). Arthur Miller's Death of a Salesman and Tennessee Williams' Cat on a Hot Tin Roof are two American plays in which the patriarchal family structure is clearly displayed.

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*A Senior English major from Tupelo, Mississippi,
Emily Comer hopes one day to find a use for her degree
that is both lucrative and entertaining.*



The Woman Who Did Not Exist: Chaucer's Exploration of the Heroine's Passivity Through "The Physician's Tale"

Colleen Campbell

Imagine yourself on a pilgrimage to Canterbury. Riding beside you is a physician, relating a tale of *sentence*, or wisdom. "This is a true story," he explains, "told by Livy." He narrates the sacrifice of Virginia—beautiful, innocent, and virtuous young maiden—at the hand of her loving father Virginius, in order to preserve her chastity from the evil judge Appius. The tale, full of pathos, strikes pity into the heart of your companion, Harry the Host. "Her beauty was her death!" he exclaims and rails against everything that has apparently brought about her demise: the wicked judge and his companions, nature, and fortune.

"The Physician's Tale" is frustrating, confusing, and disturbing to modern-day readers and critics alike. What is it supposed to mean? What vice is it warning against? Are we supposed to take it at face value and wallow in the gratuitous pathos? Many critics have thrown up metaphorical hands and dismissed the discrepancies in the tale as sloppy writing on Chaucer's part.¹

And at first glance, it certainly *seems* to be sloppy writing. The original version, transcribed by Livy, is a story about triumphing over injustice. Appius invokes the people's wrath when he tries to take Virginia from her father, who, rather than submit to

tyranny, instantly kills her and shouts defiance at Appius. Virginia is a minor character, a catalyst, and if her death is cruel, it is integral to the people's revolt that results. Jean de Meun retells the tale in *De Roman de la Rose*. He whittles the legend down to a bare outline of the events, removing all extraneous characters so that Reason can explain the story as the importance of charity over injustice.

Chaucer's version seems to come largely from Jean de Meun's no-frills account but has lost Jeun's focus. His changes in the story obscure the issue of injustice thwarted, leaving the reader wondering what purpose Virginia's death serves. Her slaying by her father represents not a mercy killing or catalyst to justice but a needless destruction of innocence: she is slain so as to die morally, her chastity intact. As critics such as Emerson Brown and Roger Ellis have pointed out, Virginius is an exemplary hero in Livy and Jean de Meun's stories; but Chaucer deliberately parallels him with the villain Appius, perhaps suggesting that his slaying of Virginia is villainous instead of virtuous. Furthermore, unlike his heroic precursor—who killed his daughter instantly upon understanding that there was no alternative to her death—he goes home to tell his daughter that she must die without recourse, escape and resistance not even being considered. Sheila Delany criticizes, "Chaucer systematically obliterates the traditional social content of the legend of Virginius and fails to replace it with explicit social commentary in his own or a narrator's voice" (51).

And yet, is Chaucer—author of many other tales of social commentary through female suffering—such a careless writer? Would he create this frustrating story of a needless, unpalatable death without this result being deliberate? The question, I believe, is not "Why is Virginia needlessly a victim?" but "Who and what make her a victim?" In his portrayal of the legend as an unappealing and even disturbing one, full of pathos but with no clear moral, Chaucer is pointing a finger at the true victimizers in the tale and its contextual society.

Virginia is the epitome of virtue and innocence, and Chaucer is telling the story of innocence ravished by evil, socially if not sexually. But the Physician, like the rest of his society, sees Virginia only as a vehicle for pathos; he does not recognize that the pathos results from a society whose sense of morality results in its exploitation of Virginia. One of the seemingly gratuitous additions Chaucer makes to the tale is an unfocused discourse on the responsibility of parents to chastise their children, lest they perish from the forces of evil. As Helen Cooper notes, this admonition is deeply ironic in that it is from her father's chastisement that Virginia perishes (253). But what is her crime? It seems to be merely that she is virtuous and beautiful, attributes a parent should supposedly foster. Virginius's conversation with his daughter before he decapitates her is thick with pathos, and yet it does not exemplify a father grieving for the fate of his virtuous daughter. His authoritarian "sentence" leaves his audience more confused than sympathetic to his loss:

"Take thou thy deeth, for this is my sentence.
For love, and nat for hate, thou most be deed;
My pitous hand moot smyten of thyn heed". . .
"O mercy, deere fader!" quod this mayde. . .
And seyde, "Goode fader, shal I dye?
Is ther no grace, is ther no remedye?"
"No, certes, deere doghter myn," quod he. (224-26,
231, 235-37)

Do I have to die? she pleads; his response, "pitous hand" notwithstanding, is far from lovingly paternal or sympathetic. He offers no mercy and no alternatives to her death and swiftly dispatches her.

Amidst these frustrating lines of virtue helpless before evil is another anomaly. Virginia, before she submits to her death, asks whether she may weep a bit, as Jephthah's daughter did in the Old Testament. As Ellis points out, "This moment is barely plausible: no matter how virtuous she is, a pagan girl can hardly know the Old Testament" (215). The Physician is using it as an-

other crutch of pathos to help his audience of Christian pilgrims accept and identify with Virginia's inexplicable death. But what is Chaucer himself trying to say with this Biblical reference? Jephthah has vowed to God, out of gratitude for a victory, to sacrifice the first of his household to greet him, which in this case happens to be his daughter. She asks leave to lament the fact that she dies a virgin and thus has not fulfilled her highest duty to God. Virginia, in contrast, is slain to *preserve* her virginity. Virginia's chastity takes priority over her life itself—an outcome acceptable to both Livy's audience and Chaucer's.

Cooper notes that St. Augustine made a theological distinction between the willing and the unwilling loss of chastity, according to which the killing of Virginia is gratuitous and sinful (253). Cooper continues, however, that St. Jerome, centuries later, "thoroughly confused the categories, and . . . the status of perfection accorded to virginity by the Church is alone sufficient to make the story comprehensible in medieval cultural terms" (253). So Virginia's death, while abhorrent to modern-day readers, would have been less so in medieval society, which would dismiss the meaninglessness of her demise by praising her chastity. Chaucer, by contrasting his heroine with the Biblical virgin who *mourned* her state of virginity, may be admonishing his audience not to exalt virginity and hold life at such little value.

Virginia is destroyed, the Physician implies, by the conflict between a wicked judge's lust for her and her own unblemished morality. She submits to the beliefs that her life is subordinate to her virginity and that her desire to live is subordinate to her society's insistence that she die. But who is it that actually strikes the blow against her? It is only natural that Harry the Host, exclaiming, "Her beauty was her death," is confused in his attempt to discern the agent of Virginia's death: his understanding is as garbled as his society's. He blames her death on not only the judge and his associates, but fortune and nature. And as Brown comments, "If 'hire beautee was hire death,' as Harry believes, then the moral of the tale has evaporated" (137)—she has died to

pay for desirability to Appius. It is, in fact impossible for the Host, the contemporary audience, and the reader to pinpoint the responsibility for her death.

Who killed Virginia? It was her father, Virginus. In Livy and Jean de Meun's versions, her death obtains political justice. But in Chaucer's version, there is no excuse provided for Virginus's murder of his daughter except his own arbitrary "sentence," which he passes on her as Appius has. Virginus's "love" in giving his daughter her death takes no more heed of her as a person than does Appius's lust. Appius's greed for Virginia is his motivation to destroy her; Virginus has no justification for destroying her but his "sentence"—his verdict that she must die. He sees her as an extension of himself and thus completely subjugate to his judgment—a familiar concept in the medieval Christian patriarchal society. Virginia dies because she does not exist for her father except as an extension of him, subject to his will.

And his will it is that she die. Virginia does not even ask him to reconsider, to fight for her sake, hide her, or enlist the help of the people who are certainly willing to oppose their corrupt judge. Accepting her authoritarian father's sentence, she merely utters what I consider to be a pivotal line of the story: "Dooth with youre child youre wyl, a Goddes name!" (250)

Do your will, Virginia cries passively—not God's will, to which all were supposed to be obedient. Ellis notes that Jephthah, in killing his daughter, "is bound by his vow to God, [but] Virginus only by an unjust sentence" (215). Virginus is not enforcing God's will but executing his own, in God's name. Brown clarifies Virginia's cry: "God and father become fused into a single power, and the daughter's virtue lies in absolute submission" (140). Virtue is translated into passivity, subjugation to needless suffering, and complete submission to a victimizing patriarchal society, whether God has anything to do with it.

What are the implications of this tale of female passivity before male authority, in the context of the other tales on the Canterbury pilgrimage? As Harry exclaims, Virginia's beauty is her

death—but only in a society that appropriates and abuses it. Instead of being rewarded for her beauty and virtue, she is condemned to suffering. And it is with this realization that the reader might recall other heroines within the *Canterbury Tales* who similarly suffer for their passivity. “The Man of Law’s Tale” tells of Constance, who is sent to Christianize far parts of the globe, continually abused by men, and rewarded at the end with a scant year of happiness with her husband. Constance’s passivity to the will of God is her exemplary virtue, which should be respected but is instead exploited by men. Griselda’s husband in “The Clerk’s Tale” takes her children from her and tells her they have been killed, to test her submission to his will. In “The Franklin’s Tale,” to maintain his sovereignty, Dorigen’s husband sends her to commit adultery with another man. All of the suffering of these females may or may not be gratuitous, but all of it occurs from the imposition of man’s will over God’s.

Yet there are heroines in the *Canterbury Tales* who do not unduly suffer. May, from “The Merchant’s Tale,” quite happily commits adultery and makes a fool of her decrepit husband. The Wife of Bath flaunts the lack of sexual inhibition in her lifestyle. The adulteress Alison is the only character who does not suffer in “The Miller’s Tale”: her lover, her would-be-lover, and her husband end up with varying degrees of pain and acute embarrassment. These females do not suffer because they do not passively accept the imposition of their husbands’ wills over God’s.

In fact, it seems that in the *Canterbury Tales*, a heroine’s perception of herself as subjugate to her husband as an extension of his authority is inversely related to her happiness. The interplay between physical beauty (i.e., her likelihood of being exploited) and moral beauty (i.e., her passivity to being exploited) results in a heroine’s relative suffering or satisfaction in life. As Cooper states, “Virginia is cast more completely in the role of passive victim than any other leading character” (254). Thus, Virginia suffers more completely than any other victim of the passivity standard: she is sacrificed to it.

Chaucer is certainly aware of the subjugation of women in his society, including the abuse that women suffered in being subject to men's will in the name of God. What does he really think of this abuse, and how willing is he to let his work stand as an accusation of those who propagate it? Chaucer may or may not have intended "The Physician's Tale" to be a commentary on the other passive heroines in the *Canterbury Tales*. But he does impart explicit social commentary through the changes he makes to the legend of Virginius to recreate Virginia as the passive, gratuitously victimized woman that she is. Chaucer, by bringing the tale of the passive heroine to its conclusive extreme, is asking what the ultimate cost is of such victimization.

Notes

1. See, for example: Neville Coghill, *The Poet Chaucer*, 2nd ed. (London: Oxford UP, 1967); E. Talbot Donaldson, ed., *Chaucer's Poetry: An Anthology for the Modern Reader* (New York: Ronald, 1958); Derek Traversi, *The Canterbury Tales: A Reading* (Newark: U of Delaware P, 1982); Lee C. Ramsey, "The Sentence of It Sooth Is: Chaucer's *Physician's Tale*," *Chaucer Review* 6 (1972): 185-97; Charles Muscatine, *Poetry and Crisis in the Age of Chaucer* (Notre Dame, IN: U of Notre Dame P, 1972); Sheila Delany, "Politics and the Paralysis of Imagination in *The Physician's Tale*," *Studies in the Age of Chaucer* 3 (1981): 47-60; Thomas L. Kinney, "The Popular Meaning of Chaucer's 'Physican's Tale,'" *Literature and Psychology* 28 (1978): 76-84.

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Colleen Campbell has been an English major since seventh grade, when, upon dissecting a frog, she realized that she did not want to be a veterinarian.

She hopes to be a writer, primarily of literature and drama, but her other interests include calligraphy, Disney animation, Celtic music, and blonde jokes.

This paper--her first to be published--was conceived for and presented at the Gender in the Nineties Conference at Furman University, South Carolina. After graduation, she hopes either to study women's issues in the Middle East or go into massage therapy schooling, while continuing to write.

Visions of the Apocalypse: *Piers Plowman* & *Philadelphia Fire* *Julie Dykes*

Birmingham-Southern College has chosen to classify medieval English literature as "literature of a different time, place, or culture" ("Courses of Study"). This genre, which includes works such as Beowulf and Sir Gawain and the Green Knight, does confront medieval issues such as upholding the comitatus relationship and maintaining courtly ideals. However, in spite of the college's classification of this literature, much of it addresses problems which are still relevant in today's American culture. One of the most timeless pieces of medieval English literature is William Langland's Piers Plowman. In this fourteenth-century dream vision, Langland addresses such themes as corruption in governing bodies and the search for truth in a rapidly deteriorating society. These same themes are echoed in Philadelphia Fire, a recent novel by John Edgar Wideman. In examining both of these works, one can find parallels not only in their thematic content, but also in the authors' use of characterization, allegory, and symbolism to illustrate the full impact of these issues on society.

One of the major themes of Piers Plowman and Philadelphia Fire is the increasing corruption in governing bodies and their inability to handle problems. In Piers Plowman, this exposition of unfair government is particularly noted in the church, which was at that time a dominant force in politics and culture.¹

Langland's attack on the church is so powerful that J. Douglas Canfield chooses to classify Piers Plowman as a "corrective satire" (249). By this definition, the poem "attacks deviant behavior and which provides a standard . . . by which to judge the behavior as deviant" (249). Canfield focuses on the clergy's paradoxically deviant behavior such as swearing and taking bribes for pardons (250). To illustrate his assertions, the critic cites the scene from Passus V in which a "pardoners swearing 'By Saint Paul!' sees only an opportunity to make money, and he runs out to fetch his relics and bulls" (250). Langland shows that the church has become ineffective in leading its people because of the hypocritical behavior of the clergy. The strongest illustration of this theme comes at the close of the poem. In this apocalyptic vision, Will sees the Christian community under siege from the Antichrist (Langland 248). The worst casualties are church members who have paid friars to absolve their sins. This results in disaster when Pride begins to attack. As Conscience calls for Clergy to come to his aid, Peace replies,

He's lying drowned in a daze . . . and so are a number of others. This friar cast a spell on them . . . His plasterswork so subtly and so smoothly that these people have lost all fear of sinning. (Langland 254)

Here, Langland succeeds in convicting the clergy for producing a church that cannot withstand the attacks of sin and effectively lead its people. Langland also shows another problem of the church: the apparent spiritual density of a number of the clergy. In the scene in which Piers is given a pardon from God, the priest exclaims,

"By Saint Peter! I can't find any pardon. There's just 'Do well and have well, and God will receive your soul' and 'Do evil and have evil, the devil will take your soul. (78)

One critic asserts, "Establish this clause in the minds and hearts of worshippers, and all the elaborate machinery of penance devised by the medieval church will become superfluous"

(Fowler 253). The critic emphasizes the fact that the layman, Piers Plowman, has a true understanding of the pardon and repents, while the priest can only sneer at the layman's knowledge of the Bible (254). Through this illustration of the lack of spiritual comprehension in the clergy, Langland adequately displays the inability of the church to lead its people.

In much the same way that Piers Plowman illuminates the church's inability to give true spiritual guidance to the masses, Philadelphia Fire shows the contemporary American government's inability to effectively solve the monumental problems facing the urban poor. Langland writes of a church that is primarily concerned with having authority and wealth; Wideman writes of a government that will not sacrifice its image of authority or wealth to keep from killing innocent people. The event that inspired the novel, the police bombing of a slum house headquartering an Afrocentric group ², is in itself enough proof to support Wideman's opinion of the government. However, Wideman provides further examples of the government's unscrupulous treatment of the urban poor.

One of these examples comes in the form of Timbo, cultural attache to the mayor. A former idealistic college friend of Cudjoe's, "Timbo assumes his place within the system he once rejected years before, . . . his fantasies of collective change withered like dry grass" (Bray 7). In becoming part of the system, Timbo becomes used to justifying the government's questionable actions such as demolishing slum houses to erect profitable condominiums:

Area like this University City wasn't nothing but a gleam in a planner's eye . . . Look at it now . . . Can't argue with progress. At the same time over in the north and in the west where people from here are forced to move, what's growing is garbage dumps. (Wideman 79)

Unlike Timbo and the government, Cudjoe does not see progress occurring. Instead, he sees the city as a "derelict in a terminal stupor, too exhausted, too wasted to move, rotting in the

sun" (20). Because of the government's blindness to urban decay, it cannot respond properly. Margaret Jones, a former Move member, says in her interview with Cudjoe, "We're not looking for help from you or nobody else. Help is what started this mess. Somebody called himself helping is the one lit the fire" (34). The government in Wideman's Philadelphia helps the condition of its poor people even less than Langland's money-obsessed clergy help the spiritual growth of their parishioners. For both authors, the constant rationalization of government's deviant behavior has produced societies that hold little regard for the truth.

This disregard for the truth is emphasized by the fact that, in both works, the main characters continually seek truth. Muscatine concludes that "we must agree that all the searches in the poem are for truth" (79). From the beginning of

Piers Plowman, Long Will seeks to know exactly where to find Truth as he begs Holy Church, " 'teach me some way by which I can recognize what is false' " (Langland 15). However, Holy Church, having already given her explanation of Truth, leaves and Will must find others who also know the way to Truth. Piers Plowman knows the way to Truth, but Langland shows that few choose to follow his instructions: "Some of the people . . . were sitting down and singing songs over their ale; their sole contribution to ploughing half-acre field was 'Fol-de-rol and fiddle-dee-dee!' " (67). Only Will sees the value of Piers Plowman and, upon seeing him again exclaims " 'Piers the Plowman!' I echoed—and from sheer joy at hearing his name, I fell at once into a deep faint" (188). Unlike the people around him, Will recognizes the importance of knowing Piers Plowman and the ultimate importance of finding Truth.

Cudjoe also recognizes the importance of finding truth. However, while Will's search is for spiritual truth, Cudjoe's search stems primarily from the desire to learn the truth about himself. The reason for this, one critic claims, is that "Cudjoe's quest is largely internal and what he's looking for is largely an expiation of the guilt he feels for having rebelled against a network of Afro-

American taboos" (Phillips 39).³ It is the story of a young boy who escaped from the fire that spurs Cudjoe to undertake a search for the boy, and unwittingly, a search for the truth about himself. Cudjoe soon realizes what it is he is searching for: "First step is always out of time, away from responsibility, toward the word or sound or image that is everywhere at once, that connects or destroys" (Wideman 23). That "word" that Wideman writes of can only be interpreted as truth, which can connect Cudjoe to his past or destroy his identity. Cudjoe realizes that "he must travel to those other places . . . at the risk of turning to stone, look back at his own lost children" (23). Cudjoe's search for the truth is especially poignant because many of his experiences mirror those that have occurred in Wideman's life.⁴ In Philadelphia Fire as well as Piers Plowman, the main character's search for truth ends in ambiguity, and the readers never learn if the characters succeed. Because of this ambiguity, the audience is left to wonder if there can ever be any possibility of finding truth.

The characterization used in these works particularly suits the theme of searching for truth. Both authors use confession as a means of characterization (Braswell 61). By confessing their sins, the main characters admit the truth of their own lives and seek to find truth outside of themselves. For the medieval audience, confession was one of the steps required for repentance and the forgiveness of sins (61). Braswell observes that "a [truly] penitent character will undergo a change from egotism to humility and will ultimately learn something . . . but a false confessant will make no change at all" (69). Piers Plowman contains several confessions that reveal as much about their characters as they do about the characters' sins.

In contrasting a true penitent with a false one, Langland shows the audience what and what not to do to obtain a true penitential state. The true penitent can be found in Hawkyn. Braswell points out that this witty wafer seller is "strangely silent" during and after receiving chastisement from Patience. The merry Hawkyn "has been replaced by a character who is so meek and

mild that he no longer speaks" (79). With his newly acquired reserve, Hawkyn typifies the proper medieval sinner. Langland chooses Long Will as the example of the unsuccessful confessor. Although Will meets numerous "spiritual 'teachers'" in his visions, he does not change upon waking but remains static (80). Braswell concludes that "because he never makes a proper confession . . . , Will's character cannot develop" (80).

While Will remains unaware of his misdemeanors, Cudjoe is painfully aware of his own shortcomings and sins. Cudjoe has gone against the grain of black society by leaving his neighborhood, marrying a white woman, and finally exiling himself on a Mediterranean island. In one searing phrase, Cudjoe realizes that he must confess because it is useless to try to hide:

How did she know so much about him, not only her but all her sisters, how, after the briefest of conversations, did they know his history, that he'd married a white woman and fathered half-white kids? How did they know he'd failed his wife and failed those kids They knew his secret, that he was someone . . . who couldn't be depended upon? (9-10)

By confessing these failures to himself, Cudjoe reveals his character's history. In this process Cudjoe also comes to the realization that he must somehow reconcile himself as a black man to the culture that has sprung up while he was away. Though Wideman and Langland span a period of over six hundred years, each illustrates the need for man to confess his wrongdoing before a change can occur in his character.

As well as having parallel use of confession as characterization, Piers Plowman and Philadelphia Fire also contain parallels in allegory and symbolism. Whereas Langland relies primarily on allegory to illustrate his themes, Wideman relies on symbolism. Though the literary devices are not exactly parallel, each provides distinctly similar interpretations of the theme. Langland's use of allegory allows the reader to view the effect of

theoretical ideas on human life (Hagen Lecture). To illustrate the people's attitude toward an overly-powerful government, Langland includes an elaboration on the popular folk motif of the belling of the cat (Hagen). In this allegorical scenario, readers are shown the effect of allowing their government to retain too much power. As an outspoken mouse asserts, "Let's never do anything that might offend his dignity. A small nuisance is preferable to an injury with long-term consequences" (Langland 6).

Throughout this poem, such characters as Patience, Need, Conscience, and Pride are well-delineated as to what effects they show. However, Langland chooses one of the most ambiguous characters, Piers Plowman, to illustrate the quest for truth. This devout plowman is interpreted as a "composite symbol" who represents the union of Christ and man (Manning 98). He is the connection between man and the way to Truth while he is also the recipient of a pardon from God. In conceptualizing these identities with Piers Plowman, the medieval audience would have associated him with Christ due to his role as the connection between God and man; they would then associate him with man due to his reception of a pardon from God. In addition to reinforcing the themes of the poem, the author's use of allegory and symbolism reveals the dominant Christian mindset of the medieval audience.

In the same revealing manner, Wideman knows his audience of the 1990's is used to graphic violence and he uses symbolism to force his audience to acknowledge the importance of the themes expressed in Philadelphia Fire. In expressing his views of decay in government, the author uses the image of the fire and the injustice that results from it to describe the system of authority as a whole. As Cudjoe discusses his plans to write a novel about the Move incident, Timbo warns "forget the fire. Play with fire you know what happens. You'll get burnt like the rest of us" (Wideman 88). Just as Langland did with the belling of the cat, Wideman uses this image to show his readers what happens if people's apathy allows a government to develop monstrous power.

In addition to comparing the fire to corrupt government,

Wideman also associates the young boy who escaped the fire as the way to truth. As Cudjoe ponders his obsession with this boy, the author presents the boy as a Christ-like figure who holds the key to Cudjoe's emptiness:

the child who is brother, son, a lost limb haunting him since he read about the fire He must find the child to be whole again He knows he must find him. He knows the ache of absence His identification with the boy persists like a discredited rumor Like the Second Coming. (7-8)

The fact that the boy alone escaped from the all-consuming fire reminds the reader of the fact that Jesus alone escaped the fire of death. Wideman's description of the boy also identifies him as the connecting Christ-like figure of the novel, having the same purpose as *Piers Plowman*. Throughout these two literary works, the comparable uses of allegory and symbolism mirror their parallel thematic contents.

Because *Piers Plowman* and *Philadelphia Fire* are separated by more than six hundred years, they illuminate literature's ability to transcend time. With their common themes, these works elucidate the universality of human culture. Corruption in government is still a major concern today with such incidents as the Iran-Contra Affair giving the public much the same image of the American government as the medieval audience had of the church. Searching for the truth is as popular as it ever was if one considers the increasing popularity of the New Age movement.

In comparing *Piers Plowman* and *Philadelphia Fire*, one is forced to acknowledge the unfortunate timelessness of these problems as well as the hope that comes from the comprehension that the common man has survived despite the continuing injustice of the world.

Notes

1. The church was so powerful that it could make or break wars

between countries. Fowler points out that while the papacy was exiled in Avignon, "the popes tended to side with France in the conflict with England, so that their efforts to bring about peace had little effect" (229).

2. The Afrocentric group, Move, was "regarded with some hostility by the local community, both black and white" (Phillips 39).

Mike Phillips reports, "After a siege, the black mayor . . . gave the police permission to drop a bomb on the roof of Move's headquarters. Several people were killed, and the fire spread to neighboring blocks" (39).

3. The character of Cudjoe has, unlike a large segment of black society, married a white woman, fathered children, and then deserted his family and exiled himself on a Mediterranean island.

4. Wideman also married a white woman and became a writer as Cudjoe is. Wideman includes in the novel a phone conversation with his own son, Jacob, who is schizophrenic and serving a life sentence for murder (Sanoff 92).

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*Julie Dykes is a Junior English major/ Biology minor
from Brimingham. When she is not writing academic papers,
she enjoys writing about her exploits as a
chicken processing plant employee.*

The Evolution of Jazz in African-American Culture

Clay McCaslin

A divorced man sits alone in a tired, musty barroom, staring down into the bottomless pit of his scotch and soda. On the brink of mid-life hell, he resignedly waits for forgetfulness to overtake him. In the front of the room, an obscure jazz trio stoically attempts to absorb some of his pain. In reciprocation, the divorced man quietly and unconsciously drinks in four-hundred years of African-American suffering. Perhaps jazz soothes him because it speaks to him of a similar plight. Descended from the tribal hymns of West Africans, jazz encompasses all that is unique and special in the African-American musical and oral tradition. Like the man in the bar, jazz too possesses a nameless sorrow—the struggle of one culture to maintain its identity after being tossed unwillingly into another. Although adopted by white society, jazz is a music which was born from the African-American culture, and as such, its evolution runs parallel to the integration of African-Americans into this society. The development of the music which we know as jazz can be divided into six broad stages corresponding to the needs of African-Americans at given points in history: Tribal music, slave work songs, spirituals, the blues, early jazz/ragtime/New Orleans, and modern jazz. A breakdown of these various musical forms reveals that they are all closely related to simultaneous social developments in African-American life.

Unfortunately, Westerners tend to credit Europe with the creation of modern Western music. However, most of the music which we enjoy on a day-to-day basis is probably derived from Africa. Jazz unquestionably relies heavily on African influences. A close examination of the important techniques in jazz confirms this theory. Jazz possesses the same elements which characterize West African tribal music: improvisation, antiphony, rhythm, and blue tonality (Wilton 2). Improvisation, for instance, instantly comes to mind when we think of jazz; however, any analysis of West African music shows it to have always been important in that culture as well. Due to the call-and-response nature of most African music, the soloist or leader found himself in a favorable position for improvisation (Wilton 10). This call-and-response pattern between a group and its leader in West African music is known as antiphony. Both antiphony and improvisation work together as the basis of all African-American music, as pointed out by LeRoi Jones:

Another important aspect of African music found very readily in the American Negro's music is the antiphonal singing technique. A leader sings a theme and a chorus answers him The amount of improvisation depends on how long the chorus wishes to continue. An improvisation, another major facet of African music, is certainly one of the strongest survivals in American Negro music . . . the very structure of jazz is the melodic statement with an arbitrary number of improvised answers or comments on the initial theme. (27)

The importance of rhythm in both African music and jazz cannot be stressed enough, and its distinct presence in both attests to the relationship between the two. Like the music of West Africa, jazz emphasizes rhythm over melody (Goffin 9). This is the most obvious similarity between jazz and African music—they are both polyrhythmic; i.e. both rely on two or more separate rhythms being played simultaneously. This use of complex polyrhythms, along with syncopation, is what gives jazz its characteristic “swing” (Stearns 11). The role of the drummer in jazz is

not unlike the role of the African tom-tom beater in tribal rituals (Goffin 14). "Blue tonality" is yet another important jazz element derived from the African-American tradition. Blue tonality is achieved by combining blues scales with blue notes—a distinctly African musical creation. Dr. Marshall Stearns explains the basis of blue tonality:

To be technical, two areas in the octave—the third and the seventh in the scale—are attacked with an endless variety of swoops, glides, slurs, smears, and glisses . . . With the addition of a few blue notes, the entire harmony becomes blue, and blue tonality results. It occurs in almost all American Negro music, vocal and instrumental, and especially in jazz. (14)

According to Stearns, blue tonality originated in the tribal music of West Africa; European music has never produced anything like it. This fact alone makes it almost indisputable that jazz is a descendant of the African musical tradition.

African music first appeared in the New World in the form of slave work songs, also known as the "field holler," which served as a link between African and Afro-American music. Fearing insurrection and viewing African ritual as "barbaric," many plantation owners outlawed the use of drums and native songs among their slaves. This stripped the music of much of its cultural context, forcing the slaves to use America, rather than Africa, as a cultural reference. Jones comments on this transition:

The African slave continued to chant his native chants, sing his native songs, at work even though the singing of them might be forbidden or completely out of context. But being forbidden, the songs were after a time changed into other forms that weren't forbidden in contexts that were contemporary. (20)

In other words, a second-generation slave found no meaning in hunting songs, fishing songs, or weaving songs—all he had ever done was work the white man's land. Thus, second-generation slaves kept many of the African elements of their music, but transformed the context. The result was the work song. The work song furnished a rhythmic cue to speed up the process and lessen

the feeling of drudgery which accompanied the labor. In the work songs, the expressive African vocal techniques of falsetto, slurs, and trills were carried over from African music. Frederick Douglass refers to the music as possessing "a tinge of deep melancholy," which almost certainly alludes to what would eventually evolve into the Blues (qtd. in Wilton 29). The work songs also retained the call-and-response form of African music (Feather 13), as well as characteristic African rhythms (Stearns 70). Stearns concludes, "the work song to this day shows little European influence and retains a great many West African qualities" (69).

The next step in the evolution of jazz was the emergence of the Negro spiritual. Realizing that Christianity could be used as a means of calming Negroes into submission, slave owners began to encourage Christian worship and practices among their slaves. Not only would this effectively "westernize" them; it would also reduce the slaves' restlessness for freedom and make them forget about returning to their earthly homeland (Jones 38). The Negro spiritual passed on a number of African musical techniques, including heightened rhythm, collective participation, and blue tonality, as well as the traditional call-and-response patterns characteristic of all African-American music (Wilton 25). Spirituals were most likely a blend of African and European musical elements, in which slaves adopted the traditional European hymns of their masters and embellished them with rhythm, blue tonality, and vocal expressiveness (Stearns 93). Jones confirms this idea:

The melodies of many of the white Christian and European religious songs which the Negroes incorporated into their worship remained the same, but the Negroes changed the rhythms and harmonies of these songs to suit themselves Rhythmic syncopation, polyphony, and shifted accents, as well as the altered timbral qualities and diverse vibrato effect of African music were all used by the Negro to transform most of the 'white hymns' into Negro spirituals. (47)

The arrangement of voices in Negro religious music seems to

have paved the way for the first instrumental voicing of New Orleans jazz, as well as many of the "riffs" and musical themes of later jazz music (Jones 46-47). The addition of European instruments to the Negro spiritual produces a form of music very similar to early jazz (Stearns 30).

Around the time that blacks were emancipated from slavery, the form of music known as the blues slowly began to emerge. The slave population suddenly found itself diffused and scattered. Many former slaves became isolated sharecroppers who managed tiny farms belonging to white farmers. As a result, the Negroes found their new lives characterized by a degree of solitude which had not been present during slavery. Thus, the work songs, hollers, and group spirituals characteristic of slave music began to die out and give way to the blues (Jones 61). Blues music has its basis in the life and problems of the individual back man, as opposed to the work songs and spirituals, which focus more upon the laments of African-American culture as a whole (Wilton 35). Jones expounds on the inception of the blues:

for many Negroes there was a life of movement from farm to farm, or town to town. The limited social and emotional alternatives of the work song could no longer contain the growing experience of this country that Negroes began to respond to. Also, the entrance of Negroes into the more complicated situation of self-reliance proposed multitudes of social and cultural problems that they never had to deal with as slaves. The music of the Negro began to reflect these social and cultural complexities and change. (62)

Although the Negroes had gained their freedom, they had also inherited a whole new set of problems, ranging from economic woes to romantic entanglements brought on by their newfound independence. With the blues, African-Americans found the perfect vehicle for the expression of these new sorrows. The blues utilizes a twelve-bar pattern in which the first line is

sung, then repeated, then followed by a third line. The cycle continues until the song is resolved (Hamm, et. al. 143). This twelve-bar pattern issued directly out of both the work song and the spiritual, and it retained the classic call-and-response form of African music (Jones 62). The blues takes European musical forms and combines them with the blue tonality of the African tradition to create a unique form of soulful expression. Blues is based on three chords: the tonic, the dominant, and the subdominant. This three-chord structure was probably derived from Negro religious music (Stearns 77). The advent of the blues also saw the introduction of instrumental accompaniment to African-American music. Jones summarizes the nature of the blues in the history of African-American culture: "the primitive blues was at once a more formal music since the three-line, twelve-bar song became rapidly standardized, and was also a more liberated music since there was literally more to sing about." (68)

Unlike the work song or the Negro spiritual, blues still survives in a tremendous portion of the music of today. Blues as a form has been incorporated into jazz, rock, country, and popular music. It is also the first African-American music which gave rise to great individual black performers. Some of the famous blues pioneers include Leadbelly, Blind Lemon Jefferson, Robert Johnson, and Mamie Smith. As Jones so aptly puts it, "the term blues relates directly to the Negro, and his personal involvement in America" (94).

Simultaneous with the birth of the blues in this country was the development of a form of music called ragtime. Named for its "ragged" rhythms, ragtime employs a strongly-syncopated rhythmic meter to create a unique musical sound. As in the blues, many of the characteristic African-American musical techniques of the spiritual and the work song were retained in ragtime. Ragtime originated in the Midwest, fathered by the classically-trained Negro composer Scott Joplin. It was the first black instrumental music in America. West African and European musical styles were combined more fully and more successfully in ragtime than

any other previous musical form (Stearns 104). Written primarily for piano, ragtime employs many of the blue notes which would become a mainstay for jazz itself. Ragtime fused with several other of the many hybrid musical forms prevalent around the turn of the century to give birth to jazz (Goffin 31). Ortiz Wilton concurs: "The subtle use of harmonic devices such as sevenths and ninths, the outlining of chord structure in the rolling bass, combined with syncopation and haunting melodic-lyricism, all point the way to instrumental Jazz" (32).

For the most part, it is undisputed that jazz as we know it arose in New Orleans. this is primarily attributed to the fact that New Orleans was and has always been a melting pot of ethnic and cultural groups. Traditionally, slaves in the New Orleans and Mississippi Valley regions were allowed to maintain more of their own cultural heritage than slaves in more puritanical regions the country. For instance, there are many accounts of "Congo Dances" which took place in Congo Square, in New Orleans. These events consisted of native dances and drumming which had been outlawed by slave masters elsewhere. New Orleans, the ever-permissive city, allowed it to survive (Goffin 13). Along with the Congo Square culture, French and Spanish influences were also present in New Orleans, which had at one time belonged to both of those countries. There were also many Creoles (persons of mixed blood) in the population, which created even greater racial diversity. The presence of so many ethnic groups caused a great deal of status anxiety and class competition in New Orleans. The result of this struggle was the formation of many "associations," or social clubs, created for the purpose of reducing status anxiety by encouraging integration. These social clubs hosted many functions, or "balls." Wilton explains the consequences of these mixed gatherings:

Out of this social synthesis came a cumulative musical synthesis, which incorporated Spirituals, the syncopated elements of Ragtime, the brass and wind instrumentation of European band music, the voodoo aesthetic and many of the elements and formal

arrangements of the Blues. (57)

Burdened by a sense of inferiority to the white race, many newly-freed blacks in New Orleans tried to imitate the European music of the whites. Unconsciously, they fused this European music with their own musical techniques. For the first time, blacks were purchasing and playing brass and woodwind instruments, though most of them had little education and could not read music. These early bands tried to play local French folk tunes, but the result was a cross-cultural, bluesy, improvised, rhythmic soup. Robert Goffin writes, "The birth of jazz was now imminent. The music was no longer fold song and not yet jazz. It was something strange and undefinable." (21)

Due to the segregation laws of the late-nineteenth century, the previously aloof Creoles from downtown began to settle in the uptown black neighborhoods, and the social clubs provided intimate contact between the two racial groups. The Creoles and blacks began to form instrumental bands and to mix with one another at parties and dances. As it turned out, the new music appealed to a cross-section of New Orleans society. Jazz was born.

As jazz moved up the Mississippi River into Chicago, and later to New York, it began to enter into the mainstream of American life. From 1917 until 1927, jazz spread like an epidemic across America. This period of times has been coined "The Jazz Age." Now that jazz had become mainstream, it was no longer a solely black music; however, there was definitely a distinction between "white jazz" and "black jazz." Louis Armstrong and Duke Ellington made extensive contributions to "black jazz" during the period of time that jazz was still divided into two separate entities (Feather 42). Fearing that whites were gaining too much control over the music they had spawned, black jazz musicians developed "bop" in the 1940's. This wildly-improvised, complex, drug-oriented music shifted the focus of progressive jazz towards the black community once again. Dizzy Gillespie, Charlie "Bird" Parker, John Coltrane, Thelonious Monk, and numerous others pioneered this counter-cultural movement. Once again, blacks

had demonstrated jazz to be an art unique to Afro-American and its changing needs. Jones carries this idea further:

Jazz as it was originally conceived and in most instances of its most vital development was the result of certain attitudes, or empirical ideas, attributable to the Afro-American culture. Jazz as played by white musicians was not the same as that played by black musicians, or was there any reason for it to be. The music of the white jazz musician did not issue from the same cultural circumstance; it was, at its most profound instance, a learned art. (53)

By the 1950's, many of the stylistic differences between "white jazz" and "black jazz" had been narrowed (Feather 47); however, black musicians have continued to make monumental contributions to jazz since then, just as they always have. The history of these contributions is far too exhaustive to cover in this paper; entire volumes could not begin to trace the full impact of blacks in the world of jazz. Aside from the musicians already mentioned, just a few of the many notable black jazz musicians include Ella Fitzgerald, Miles Davis, Fats Waller, Earl Hines, Maynard Ferguson, Jelly Roll Morton, Charles Mingus, Lester Young, Coleman Hawkins, and Branford Marsalis. The list could go on and on. Nat Hentoff contemplates the significance of jazz to Afro-American culture:

It is because Negroes are denied full acceptance as individuals that they take such fierce pride in the fact that at least jazz is theirs, that it began as Afro-American music, and that the majority of its most internationally applauded figures are Negro. Since the whites outside fight their entrance into homes and schools and jobs, many Negro musicians are all the more determined to fight to keep jazz for themselves, or as much of it as they can. (66)

It should be quite clear by now that jazz is unquestionably a product of the African-American musical tradition. Its heritage stretches from the tom-toms of West Africa to the bittersweet spirituals of plantation slaves to the bizarre blend of music heard in

New Orleans at the turn of the century. Jazz is crucial to black identity, because it was born from the history and struggles of the African-American. It is impossible to speak of jazz without speaking of black people; in a sense, the music of jazz tells their story. It is an amazing and diverse music created by the sociological forces which have continually changed the needs and circumstances of African-Americans. Even today, jazz is still changing and evolving, just as it has always done. Renowned trumpeter Wynton Marsalis muses, "Jazz is the nobility of the race put into sound; it the sensuousness of romance in our dialect; it is the picture of the people in all their glory" (139).

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Clay McCaslin is a Junior English major from Birmingham, AL. He stands 5' 8" tall and has Nordic features. He is into trees, classical guitar, and a leisurely pace at all things. His favorite tree is probably the Aspen or the Blue Spruce. He eats his eggs over medium when he eats them, and he voted Libertarian in the 1992 Presidential Election. His best ideas occur when he is driving or sitting on porches, and his fondest memory is cross-country skiing by moonlight in Minnesota's Northwoods. Before he dies, he wants to visit Ireland and Tibet.

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